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SECOND ANNUAL REPORT

OF THE

DEPARTMENT OF INDUSTRIES

OF THE

PROVINCE OF BRITISH COLUMBIA

FOR THE

YEAR ENDING DECEMBER 31ST

1920



PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C. :
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
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To His Honour WALTER CAMERON NICHOL,
Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

The Second Annual Report of the Department of Industries of this Province
is herewith respectfully submitted.

JOHN OLIVER,
Premier.

Premier's Office,
February 9th, 1921.

DEPARTMENT OF INDUSTRIES,

VICTORIA, B.C., February 9th, 1921.

The Honourable John Oliver, Premier,

Minister of Industries, Victoria, B.C.

DEAR SIR,—In pursuance of section 9 of the "Department of Industries Act,"
I enclose herewith Annual Report.

Yours truly,

D. B. MARTYN,

Industrial Commissioner.

Report of the Department of Industries.

To the Lieutenant-Governor in Council, Victoria, B.C.

SIR,—In accordance with the "Department of Industries Act," the following report is made. It contains:—

- (a.) Organization:
- (b.) Research-work:
- (c.) Summary of Applications received:
- (d.) Loans granted:
- (e.) Statement of Repayments and Interest Overdue:
- (f.) Classification of Applications:
- (g.) Financial Statement showing the Disbursements from the Development Fund:
- (h.) Industrial Summary of Provincial Industries:
- (i.) Report of Nichol Thompson on the Markets for Iron and Steel:
- (j.) Classification of British Columbia Industries.

(a.) ORGANIZATION.

The Department of Industries as at present organized consists of the Minister of Industries, the Honourable John Oliver; a Deputy Minister, known as the Industrial Commissioner, Major Donald B. Martyn; and an Advisory Council to the Industrial Commissioner, acting without pay, who are: Major R. J. Burde, M.C., M.P.P., Port Alberni; F. G. Dawson, Prince Rupert; Joshua Kingham, 1004 Broad Street, Victoria; James H. McVety, Labour Temple, Vancouver; J. E. W. Thompson, c/o Restmore Manufacturing Co., Vancouver; Nichol Thompson, 847 Beatty Street, Vancouver.

The Advisory Council of the Department of Industries held five meetings during 1920 to consider the applications for loans made to the Department; a complete summary of them is embodied in this report.

(b.) RESEARCH-WORK.

During the year 1920 considerable activity has been manifested in developing the iron and steel industry on the Pacific Coast. There are several syndicates in the field making surveys of the ore flux and fuel. The Department has co-operated in every instance, and to complete the information at present available in respect to markets, the Department had Mr. Nichol Thompson, a member of the Advisory Council, make a survey of the Coast markets and collect data in respect to possible export markets. He reports a present market on the Pacific Coast for 1,000 tons of pig-iron per day, sufficient to absorb the output of blast-furnaces of considerable size. A copy of this report is included herein.

During the year the Department made a survey and list of the various industrial plants in operation in the Province and prepared a summary of the number of firms engaged in each industry, the wages paid, the number of employees, and the average wage. As an addition to this a complete list of the industries of British Columbia has been compiled showing the nature and location. Copies of this summary and list are attached.

The large number of applications coming under the review of the Advisory Council of the Department, which in their opinion did not possess a reasonable prospect of success, prompts them to recommend the introduction at an early date of a blue-sky law. In many cases applications were submitted in respect to industries where the promotion could be placed in the category of a wild-cat promotion. It is the opinion of the Advisory Council that the industrial development of the Province would be furthered by a blue-sky law.

(c.) SUMMARY OF APPLICATIONS RECEIVED.

Total number of applications under advisement at Dec. 31st, 1919	6
Total number of applications under investigation at Dec. 31st, 1919	45
Total number of applications received to end of Dec. 31st, 1920 ..	362
Total amount applied for during 1920	\$3,044,050.00
Total amount of loans approved	\$630,658.48
Total amount of loans under advisement	\$75,000.00
Total number of applications refused	306
Total number of applications granted	60
Total number of applications under advisement	4
Total number of applications under investigation	43

(d.) LIST OF LOANS APPROVED.

Name.	Industry.	Location.	Loan.	Total Amount to be ex- pended in the Industry.	Expected to employ.
E. J. Wakefield	Willow holt	North Vancouver	\$ 1,500 00	\$ 4,500 00	2
Vancouver Island Fish & Cold Storage Co.	Fish-curing	Nanaimo	7,500 00	28,500 00	4
Wholesale Fish Co.	"	Victoria	2,500 00	5,500 00	7
H. Thompson <i>et al.</i> , operating as the Green River Lumber Co.	Sawmill	Rethel	12,000 00	18,000 00	42
Veterans' Products Co.	Fish-fertilizer	Victoria	15,000 00	25,000 00	15
Vivian Gas Engine Works	Gas-engines	Vancouver	20,000 00	49,408 00	20
Ordano Bros.	Boat-building	Cowichan Bay	1,400 00	3,750 00	5
Henson & Dyson	Concrete blocks	Victoria	4,000 00	8,708 00	12
Acme Box Co.	Wooden boxes	Vancouver	6,000 00	9,000 00	15
Canada Silica Works, to be known as the Canada Abrasive Paper Co.	Sandpaper	Victoria	22,000 00	44,000 00	16
Aetna Saw Works, Ltd.	Saws	Vancouver	15,000 00	48,100 00	8
Great West Manufacturing Co.	Cut-to-fit houses	"	15,000 00	25,000 00	12
Pacific Guano Co., Ltd.	Fish oil and meal	"	5,000 00	29,000 00	7
N.M. & R. Fish Co.	Fish company	Prince Rupert	25,000 00	38,000 00	23
B.C. Coast Fisheries	"	New Westminster ..	15,000 00	25,000 00	10
Canadian Western Woollen Mills	Woollen-mills	Vancouver	30,000 00	80,000 00	30
Stettler Cigar Factory, Ltd.	Cigar-factory	"	25,000 00	67,340 00	125
Thomas & Julian Fisheries	Fish company	"	12,500 00	20,000 00	10
Pacific Crating & Manufacturing Co.	Box-shooks and crating ..	Sidney Island	10,000 00	32,000 00	30
Canada Dolls, Ltd.	Toys	Vancouver	7,500 00	15,675 00	15
Laidlaw Shingle Co., Ltd.	Shingles	Squawfitts Island	4,900 00	10,000 00	20
Alberni Shingle Co., Ltd.	"	Port Alberni	11,000 00	17,500 00	15
Ceramic Industries, Ltd.	Bricks	Vancouver	15,000 00	36,589 00	30
Dominion Woodworkers	Wood-workers	"	1,500 00	3,500 00	6
Erskine & May	Sawmill	Merville	6,500 00	8,500 00	15
Heaton Machine Works	Machinery	Vancouver	5,000 00	11,897 81	6
McLeod & Movitz	Sawmill	Courtenay	2,500 00	5,000 00	8
Merritt Industries	"	Merritt	7,500 00	14,623 92	..
Jorgensen & Anthony	Canned goods	Vancouver	500 00	1,500 00	2
Maddaugh, Huggard & Nichols	Sawmill	Langley Prairie	26,658 48	32,500 00	30 to 40
Electrical Manufacturing Co.	Electrical appliances	Vancouver	5,700 00	15,000 00	10
B.C. Yacht & Boat Builders	Boat-building	Victoria	15,000 00	22,000 00	40
Wonder Pump & Engine Co.	Pumps and engines	Vancouver	10,000 00	26,000 00	10
Hiker Manufacturing Co.	Children's mechanical veh- icles	Victoria	8,000 00	19,000 00	17
McBride-Wells Co.	Labelling and reconditioning of canned goods	Vancouver	1,000 00	1,400 00	9
Vancouver Knitting Co.	Woollen goods	"	19,000 00	123,753 91	66

Name.	Industry.	Location.	Loan.	Total Amount to be ex- pended in the Industry.	Expected to employ.
P. E. George	Gramaphones	Victoria	\$ 2,000 00	\$ 3,005 27	2
John Arnot & Sons	Wood-workers	Vancouver	2,500 00	10,116 00	12
J. R. Tacey & Son	Sheet-metal works	"	15,000 00	44,823 00	10
Reynolds & Coote	Shingle-mill	Mission	10,000 00	18,000 00	12
T. H. Waters & Co.	Wood-workers	Nelson	15,000 00	44,300 00	14
Standard Shoe Manufacturing Co.	Boots and shoes	Vancouver	15,000 00	22,000 00	20
H. L. Johnson	Antique furniture	Victoria	300 00	922 00	2
San Juan Box Co.	Boxes	Port Renfrew	25,000 00	40,000 00	22
Vancouver Pickle Co.	Pickles	Vancouver	5,000 00	36,000 00	20
B.C. Nurseries	Fruit-tree raising	Sardis	7,500 00	40,500 00	25
Victory Attachable Rubber Soles & Heels Co., Ltd.	Rubber soles and heels	Victoria	2,000 00	8,300 00	3
Western Toy & Furniture Manufacturing Co.	Furniture and toys	Vancouver	15,000 00	53,500 00	30
Kerr Manufacturing Co.	Neckwear	"	2,000 00	5,000 00	10
Pacific Standard Motor Works, Ltd.	Engines	"	3,000 00	9,500 00	6
Canadian Western Woodworkers	Wood-working	Victoria	5,000 00	31,000 00	20
Racmaekers & Stephen Bros.	Manufacturing agents	Vancouver	1,500 00	4,500 00	3
T. J. Shore Bolt & Nut Manufacturing Co., Ltd.	Bolts and nuts	"	45,000 00	138,000 00	20
Henshall Fish Products	Fish by-products	Sooke	3,000 00	6,800 00	6
Schaake Co., Ltd.	Machinery	Vancouver	50,000 00	192,000 00	80
Sayward Trading Co.	Sawmill	Sayward	5,000 00	5,000 00	10
Kelley-Johnson Lumber Co.	"	Sooke	6,500 00	19,500 00	18
Bird & Gray	"	Saltspring Island	3,500 00	3,500 00	10
E. R. Crumner	Broom-protectors	Vancouver	200 00	500 00	1

Total amount for new industrial development subscribed by the company and by

loan from the Government \$1,662,011 91

Total number of persons for which new permanent employment will be provided 1,047 to 1,057

(c.) STATEMENT OF REPAYMENTS AND INTEREST OVERDUE.

Principal overdue	\$4,883 37
Interest overdue	351 94
Total	\$5,235 31

(f.) CLASSIFICATION OF APPLICATIONS.

Industry.	Under Advis- ment.	Under Investi- gation.	Number received.	Number approved.	Under Advis- ment.	Under Investi- gation.
Saw and shingle mills	2	8	50	10	..	7
Garage, etc.	7	..	..	..
Furniture	1	9	3	..	..
Boots and shoes	1	4	1	..	..
Toy-factories	2	2	..	..
Cut-to-fit buildings	1	1	..	..
Wood-workers	1	5	4	..	..
Iron-workers and machinery plants	2	23	7	..	6
Fish packing and curing	4	6	5	..	2
Other fishing proposals	1	32	..	..	2
Fish by-products plants	2	2	3	..	1
Ladies' and children's wear	3	..	..	..
Neckwear	1	1	..	..
Wood and coal	4	..	..	..
Trucking	12	..	..	..
Boat-building	4	3	2	..	..
Boat-hiring	5	..	..	..
Greenhouses and nurseries	1	5	..	..	2
Box-factories	1	5	2	..	1
Manufacturing electrical fixtures	3	1	..	..
Bakeries	2	..	..	..
Groceries	4	..	..	..
Gloves	2	..	..	2
Logging	1	14	..	..	1
Fruit-canneries	2	6	..	..	1
Woollen-factories	1	4	1	..	1
Broom-handles	2	..	..	1
Phonographs	3	1	..	..
Glass-works	3	..	..	..
Patent rights	1	5	..	..	1
Canoe-factory	1	..	..	..
Bottling-works	1	..	..	1
Saws	2	1	..	..
Paper bags	1	..	..	..	1	..
Brick plants	2	2	1	..	..
Slate	1	..	..	1
Cooperage	2	..	..	..
Turpentine	1	..	1	..
Eau de Cologne	1	..	..	1
Invention re sunken vessels	1	..	..	..
Upholstery	1	..	..	..
Dyeing	1	..	..	..
Plating-works	2	..	..	..
Polishes	1	..	..	..
Tailoring	1	..	..	..
Manufacturing new food	1	..	..	..
Transfer of equity in manufacturing concern	1	..	..	..
Sifter-spout	1	..	..	..
Brokerage business	1	..	..	..
Seeds	1	..	..	1
Sausage-factory	1	..	..	..
Carried forward	3	33	251	46	2	32

(f.) CLASSIFICATION OF APPLICATIONS—Continued.

Industry.	Under Advisement.	Under Investigation.	Number received.	Number approved.	Under Advisement.	Under Investigation.
<i>Brought forward</i>	3	33	251	46	2	32
Hair dyes	1	..	..	..
Auto knitters	1	..	..	..
Purchase of stock	8	..	..	..
Trading	2	..	..	..
Motor transportation	2	..	..	..
Importers and exporters	1	..	..	..
Survey-work	1	..	..	..
Commercial agencies	1	..	..	..
Restaurant	1	..	..	..
Electric culture of farm produce	1	..	..	..
Cleaning and pressing	1	..	..	..
Fish-peddling	1	..	..	..
Commission agent	1	..	..	..
Steam-shovel	1	..	..	..
Pool-room	1	..	..	..
Manufacturing men's clothing	1	..	..	1
Iron pipe foundry	1	..	..	..
Merritt industries	1	1	..	..
Baby-carriages	1	..	1	..
Pickles	2	1	..	..
Spruce products	1	..	..	..
Steel	1	5	..	..	1
Concrete blocks	2	1	..	..
Caskets	1	..	1	..
Sheep-raising	1	..	..	1
Wall-board	1	..	..	..
Flour mill	1	..	..	1
Engines	6	..	..	..
Carbine	1	..	..	..
Soap	1	..	..	1
Cigar-factory	1	1	..	..
Tannery	1	..	..	..
Fruit-growing	1	1	..	..
Crispettes	1	..	..	1
Sandpaper	2	1	..	1
Jam-factory	2	..	..	2
Printing	5	..	..	..
Motion-pictures	2	..	..	..
Meat-packing	1	..	..	..
Lignite	1	..	..	..
Explosives	1	..	..	..
Whaling	1	..	..	..
Powdered milk	1	..	..	..
Plumbing	1	..	..	..
Sight-seeing car	1	..	..	..
Lime-kiln	1	..	..	..
Spices and coffee	1	..	..	..
To purchase hotel	3	..	..	..
Silica	1	..	..	..
To build	3	..	..	..
Commercial piggery	1	..	..	..
Egg substitute	1	..	..	..
Monumental works	2	..	..	..
Photography	2	..	..	..
Trading-steamer	1	..	..	..
Buying of horses	1	..	..	..
Private schools	2	..	..	..
Chimney-sweeping	1	..	..	..
Ranching	1	..	..	..
Ochre	1	..	..	..
Adding-machine	1	..	..	..
<i>Carried forward</i>	3	34	346	52	4	41

(f.) CLASSIFICATION OF APPLICATIONS—Continued.

Industry.	Under Advisement.	Under Investigation.	Number received.	Number approved.	Under Advisement.	Under Investigation.
Brought forward	3	34	346	52	4	41
To pay promissory notes	1	..	..	..
Candied peel	1	..	..	..
Manufacturing small advertising novelties	1	..	..	..
Umbrellas	1	..	..	..
Lath and crating	1	1	1	..	..
Manufacturing jewellery	1	..	..	..	..
Coke and by-products	1	..	..	..	1
Manufacturing paint	2	..	..	..	..
Manufacturing felt and building-paper	1	..	..	1
Manufacturing chemicals and chemical fertilizer...	..	1	..	..	..	..
Development of mineral claims	1	..	..	..	..
Stoves and furnaces	1	..	..	..	..
Water-proofing oils	1	..	..	..	..
Household specialties	1	..	..	..	..
Cigar-factory	1	1	..	..
Knitted goods	1	..	..	1	..	..
Reconditioning of canned goods	1	..	..	1	..	..
Marble-works	1	..	..	..	..
Canned goods	1	1	..	..
Rubber soles and heels	1	1	..	..
Miscellaneous	5	..	..	..
Totals	5	45	360	58	4	43

(g.) FINANCIAL STATEMENT SHOWING THE DISBURSEMENTS AND RECEIPTS OF THE DEVELOPMENT FUND, 1920.

Receipts.	Disbursements.
To Balance at credit of fund,	By Disbursements on account of
January 1st, 1920 \$ 19,576 93	loans granted \$836,671 44
Advances from Provincial	Balance at credit of fund,
Treasury \$15,000 00	December 31st, 1920 9,547 64
Refunds of loans and interest 11,642 15	
\$846,219 08	\$846,219 08

(h.) INDUSTRIAL SUMMARY OF BRITISH COLUMBIA INDUSTRIES.

Nature of Industry.	No. of Firms engaged.	Total Wages paid.	No. of Employees.	Average Wage per Day.
Creosoting	1	\$ 30,132 00	23	\$5 04
Logging	567	15,336,155 00	11,250	5 25
Pulp-mills	5	3,627,223 00	2,822	4 12
Saw and shingle mills	385	14,426,922 00	12,645	4 42
Artificial limbs	1	820 00	1	6 67
Brooms and mops	7	56,563 00	113	1 93
Sash and door factories	20	201,952 00	231	3 36
Cooperages	7	79,211 00	74	4 12
Furniture-manufacturing	14	201,501 00	183	4 25
Caskets and undertaking supplies	2	51,486 00	43	4 62
Veneer and excelsior	2	93,655 00	112	3 22
Planing-mills and wood-working plants	61	1,711,496 00	1,902	3 46
Vehicle-manufacturing	5	46,041 00	36	5 00
Wooden boxes	13	313,526 00	355	3 40
Wooden-toy manufacturing	6	15,256 00	18	3 23
Carpentering (shop only)	8	22,683 00	16	5 46

(h.) INDUSTRIAL SUMMARY OF BRITISH COLUMBIA INDUSTRIES—Continued.

Nature of Industry.	No. of Firms engaged.	Total Wages paid.	No. of Employees.	Average Wage per Day.
Coal-mining	18	\$9,700,000 00	7,147	\$5 22
Sand, shale, clay, and gravel pits	5	69,237 00	63	4 24
Lime-kilns	4	66,658 00	66	3 88
Metal-mining	117	4,656,358 00	3,663	4 89
Monuments, lettering or setting	1	4,518 00	3	5 93
Quarrying	7	134,563 00	128	4 05
Stone dressing or cutting	9	59,347 00	36	6 30
Reduction of ores and smelting	5	1,407,786 00	1,081	5 01
Brick-manufacturing, tiles, etc.	11	138,236 00	106	5 00
Cement-manufacturing	1	96,000 00	150	4 00
Nut, bolt, nail, spike manufacturing	2	45,992 00	44	4 03
Can-manufacturing	3	277,722 00	335	3 19
Engine and boiler manufacturing	2	14,295 00	10	5 78
Iron and steel foundry	15	299,190 00	247	4 66
Manufacturing furnaces and stoves	8	40,545 00	46	3 42
Machine-shops	110	1,974,093 00	1,684	4 51
Iron and steel products manufacturing	8	73,512 00	57	4 93
Babbitt-metal manufacturing	2	14,653 00	32	4 16
Ornamental-iron works (shop only)	2	5,925 00	7	3 39
Rolling-mills	2	27,663 00	20	5 59
Sheet-metal works	34	148,301 00	131	4 35
Tent and awning manufacturing	7	57,229 00	72	3 07
Confectionery-manufacturing	18	347,448 00	569	2 35
Liquors and beverages manufacturing	44	375,254 00	359	4 02
Canning fruit and vegetables, also packing ..	45	956,761 00	858	4 29
Manufacturing compounds	7	76,228 00	104	2 81
Cigar-manufacturing	11	115,546 00	134	3 33
Drug-manufacturing	2	18,017 00	22	3 23
Flour and rice milling	9	48,441 00	47	3 98
Manufacturing food products	22	653,362 00	611	4 11
Bevelled, leaded glass, and silver-plating works	5	21,095 00	33	2 50
Jewellery-manufacturing	15	117,887 00	90	5 07
Knitting-mills	3	25,207 00	35	2 77
Leather-tanneries	2	32,814 00	23	3 54
Manufacturing leather shoes	2	81,900 00	90	3 50
Oil-refining	6	426,965 00	332	4 95
Manufacturing paint	8	95,601 00	122	3 01
Mfg. paper (tarred, pitched, or asphalted) ..	2	21,153 00	30*	2 75
Manufacturing rubber goods	19	59,947 00	53	4 36
Manufacturing stationery	5	73,455 00	159	1 78
Upholstering	14	82,644 00	75	4 23
Creameries	25	219,403 00	269	3 28
Ice-cream manufacturing	19	101,336 00	120	3 28
Condenseries	2	69,233 00	84	3 17
Cheese-factories	3	11,940 00	14	3 28
Explosives-manufacturing	3	341,449 00	322	4 08
Chemical manufacturing	3	50,818 00	47	4 15

* Increased in November, 1920, by approximately 74.

Report on the Markets for Iron and Steel on the Pacific Coast.

BY NICHOL THOMPSON, 847 BEATTY STREET, VANCOUVER, B.C.

At the request of individuals and syndicates interested in the development of the iron and steel industry on the Pacific Coast, the Department of Industries undertook to obtain definite information in respect to the local markets in British Columbia, Oregon, Washington, and California. To this end they engaged the services of Mr. Nichol Thompson, who has had considerable experience in collecting data in respect to the iron and steel industry. He has made a detailed survey of the iron-foundries and steel plants on the Pacific Coast, and has obtained first-hand information and opinions from the men in this line of industry. The information obtained is very valuable, in that it admits of a ready checking-up by persons interested in this industry, and is, to date, the most complete survey obtainable. While undertaking this survey Mr. Thompson interested all persons in this line of business in British Columbia as being the one logical location for the development of blast-furnaces, in that all the essential materials were to be obtained in British Columbia. His report is submitted herewith as a part of the Report of the Department of Industries.

D. B. Martyn, Esq.,

Commissioner of Industries, Victoria, B.C.

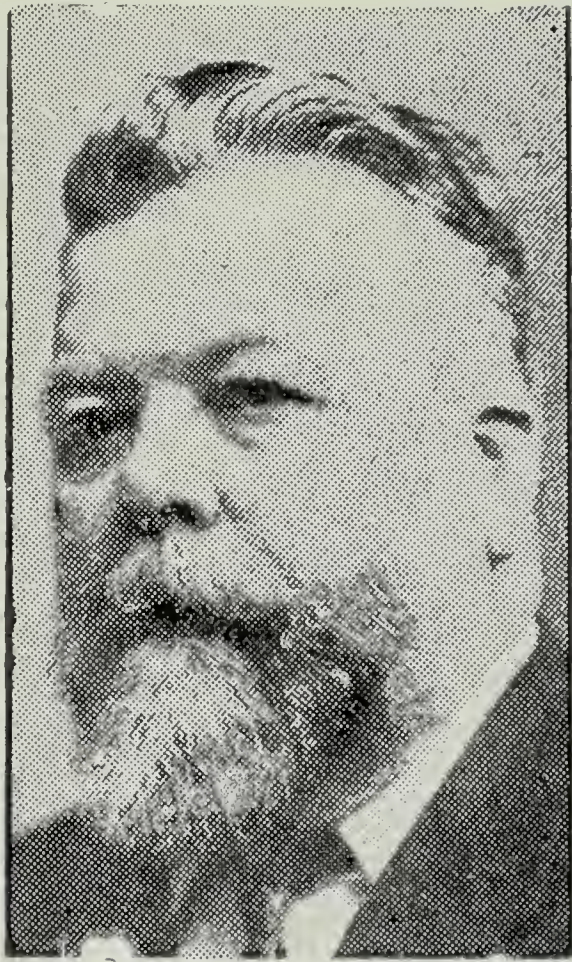
SIR.—The main object in gathering the information embodied in this report is to prove the extent of the local market on the Pacific Coast for the products of iron and steel, and especially the market for pig-iron, as the first essential in the iron and steel industry is a blast-furnace plant for the production of the various grades of pig-iron. I am, of course, aware of the fact that the success of ship-building and kindred industries on the Coast depends absolutely on being able to procure material for their various purposes manufactured on the Coast, so as to enable them to compete with Eastern and Old Country firms.

There is a market on the Pacific Coast for 2,000,000 tons per annum of iron and steel; i.e., this is the aggregate consumption of all grades, including tank, ship and boiler plate, merchant bar, tool and mining steel, structural steel, shapes and angles, and also light rails. Any one plant capable of turning out all these grades and sections of steel would require tremendous capital outlay in rolls and other equipment. If blast-furnaces were established here and supply of the various grades of pig-iron assured at reasonable price, subsidiary companies would undertake the manufacture of the different grades and sections of steel to suit the market.

There is, beyond a doubt, a local or domestic market on the Pacific Coast, from Los Angeles to British Columbia, for foundry pig-iron alone of at least 1,000 tons per day; and if produced at anywhere near the cost of steel scrap—\$27 to \$30 per ton—I think I can safely say there is a market for 2,000 tons per day. There are five scrap-mills in California, at San Francisco and Los Angeles, with monthly output of 27,000 tons, and one in Washington, at Seattle, with present output of 4,000 tons per month. These mills, turning out over 1,000 tons per day of merchant bar from steel scrap, would use at least 40 per cent. pig-iron if they could get it; in fact, Mr. Deuman, of the Southern California, and Mr. Botchford, of the Columbia Steel Mills, informed me they would undertake, on behalf of the five California mills, to contract for 500 tons of pig-iron a day. The cast-iron foundries in Washington, Oregon, California, and British Columbia will easily consume 1,000 tons per day. Undoubtedly the time is opportune and there is every inducement for capital, properly organized and managed, to get in on the ground floor with the incense of this basic industry.

EXPORT MARKET.

In addition to the local market, there is an export market looming large in the future development of the Orient, Australasia, and Isles of the Pacific, and the west coast of Mexico and South America. The present export through British Columbia ports is now practically *nil*,



NICHOL THOMPSON, ESQ.

because of the fact that Canada does not manufacture nearly sufficient for domestic requirements and at present is a large importer of iron and steel. There is, however, a very different story to tell regarding the exports through the ports of Seattle, Tacoma, Portland, San Francisco, and Los Angeles; though even here it is somewhat difficult to obtain the correct data, as many of the items are not listed by weights but rather by value, or perhaps by number and value. In point of value this export trade through United States Pacific ports in 1918 amounted to approximately \$100,000,000. The tonnage of pig-iron, steel billets, ingots, blooms, rails, and structural iron and steel in the same year totalled 1,000,000 tons and \$68,000,000 of the total valuation of exports, the balance consisting of machinery or iron and steel. It is interesting to note in this connection that for the ten months ending April 30th, 1920, approximately \$14,000,000 in steel rails was shipped to Pacific Ocean countries, and that this item represented 60 per cent. of the total United States exports in this commodity. These rails were mostly smaller and medium sizes, the percentage above 60 lb. being almost negligible.

IRON AND STEEL WORKERS CONSIDER PLANT A NECESSITY.

Heads of the various iron- and steel-working plants of the Pacific Coast in Washington, Oregon, and California, who were interviewed, and gave information freely regarding their plants, consumption, etc., were practically agreed that the establishment of blast-furnaces and a steel plant on the Pacific Coast was a necessity. The time was opportune and the project would be warmly welcomed. They said they would gladly co-operate with owners of mills producing merchant bar from scrap in California, and offered to make a contract at once for 500 tons per day of pig-iron as soon as blast-furnaces were started on the Coast. All gave numerous instances of trouble and difficulties through congestion of orders and lack of cars for transportation and delivery. Prominent mill-owners in California told of investigations made by them with a view to establishing a blast-furnace, but coking-coal supplies in Washington were found unsatisfactory, and they would welcome the establishment of a Coast plant. Washington iron and steel workers said that in 1916 a number of them, including also the manager of the Bethlehem Steel, offered Mr. Piggott, of the Pacific Steel Company, a contract for 250,000 tons of ship-plate at the same price paid in the East, but he could not undertake the work. All agreed that an iron and steel plant on the Pacific Coast would not only be a distinct advantage, but profitable to the company undertaking it, the raw materials being assured—there was no difficulty about the market—but would also be of great aid to those now engaged in the iron- and steel-working industries of the Coast, and would stimulate many new industries and additions to present industries; and, moreover, would do much for the general upbuilding of the Pacific Coast.

Those interviewed in California who agreed that a plant was a necessity and the time opportune for its establishment included D. H. Botchford, Columbia Steel Company; Mr. Burgess, Pacific Steel Company; Mr. Booth, Judson Iron and Steel Company, San Francisco; A. C. Denman, Southern California Iron and Steel Works; Mr. Hill, Llewellyn Steel Company, Los Angeles—these firms being engaged in manufacturing steel, merchant bar, mainly from scrap; Mr. Riekard, of the *Mining and Scientific Press*; Mr. Smith, of Smith-Emery Company, Chemical and Testing Engineers, who was United States Government Commissioner for Iron and Steel during the war; J. J. Tynan, Bethlehem Shipbuilding Corporation; F. Baker, Baker Iron Works—all of California. In Washington and Oregon the same consensus of opinion was held by Mr. Monteagle, Pacific Construction and Engineering Company; Mr. Smith, Smith-Watson Engineering Company; Mr. Cullers, Northwest Steel Company; Mr. Morris, Puget Sound Iron and Steel Company; B. C. Ball and H. T. Humphrey, of Willamette Iron Works; John Hartman, Atlas Foundry; F. M. Foley, Griffen Steel Works; Mr. Wylie, Tod Dry Dock Company; George Danz, Hofius Steel Company; and others. Mr. Scott, representative of Midvale Steel Company, Pennsylvania, notwithstanding that his principals owned their mills in the East, was also of the same opinion, as were other dealers representative of Eastern mills, they stating that conditions were now such that owing to congestion of orders and difficulties of transportation a plant on the Coast was a necessity.

EARLIER EFFORTS TO ESTABLISH PLANT.

The question of a steel plant on the Pacific Coast is one that has been long considered by those interested in the iron- and steel-working industries of the Pacific slope and others, and

has received serious attention from many engineers and metallurgists. Attempts to establish an iron and steel industry on the Coast are not new or of recent origin. Not only has promotion been carried on, but actual metal has been produced.

The first metal-producing plant on record on the Coast was established in 1865, when the Oregon Iron Works built and operated a small plant at Oswego, near Portland, Oregon. This plant was operated for some years. Until 1882 it had an average production of about 5,000 tons of pig-iron a year. In 1893 a shipment of magnetite of 626 tons mined at the Elsie Claim, a great bluff of magnetite on the north shore of West Redonda Island, B.C.—the only ore mined so far on that island—was shipped to the Oswego plant for treatment and made good iron. The industry was abandoned many years ago owing to inability to compete with Eastern iron-works at a time of industrial depression.

The Puget Sound Iron Company, organized by San Francisco men who acquired large magnetite-deposits on Texada Island in 1873, soon afterwards erected a blast-furnace at Irondale, Wash., and between 1883 and 1907 shipments of over 60,000 tons were made by scow and mixed with bog-iron from Hamilton, Skagit County, Washington, in manufacture of charcoal pig-iron. The original owners, in addition to the Texada mines and the Irondale blast-furnace, owned the Union Iron Works, a pioneer iron-working plant of San Francisco, now together with the Risdon Iron Works incorporated in the Bethlehem Shipbuilding Corporation. The Irondale plant suspended operations some years ago.

The late Homer Swaney in 1903-4 became interested in iron-deposits on Vancouver Island and also in the Irondale furnace, and had practically completed arrangements for the necessary capital to establish an iron and steel industry on a commercial basis on the Pacific Coast when he was drowned in the wreck of the steamer "Clallam" in 1904.

Some time ago a number of those interested in the manufacture of merchant bar steel in California, chiefly from scrap, made investigations with regard to establishment of a blast-furnace on the Pacific Coast States, but it was found that the coal-deposits of the Coast States for coke-supply were unsatisfactory; the only coal which met requirements was that of Carbonado, Wash., but uncertainty of supply and cost of production made it almost prohibitive.

Mr. Boothin, principal owner of the Judson Iron and Steel Company, San Francisco, one of five mills in California producing merchant bar of small sizes from scrap, said he and associates had seriously considered the question of establishing blast-furnaces with Puget Sound interests headed by B. L. Thane. Options had then been taken on iron properties with this end in view, but nothing had been accomplished.

During 1916 a number of men in Seattle, Tacoma, and San Francisco, including the manager of the Bethlehem Steel, offered Mr. Piggott, of the Pacific Steel Company, a contract for 250,000 tons of ship-plate at the cost being paid in the East, but he was unable to undertake the contract.

OPINION OF IRON AND STEEL WORKERS.

The consensus of opinion of owners and managers of the California iron-working plants is that the establishment of a blast-furnace and heavy-plate mill on the Pacific Coast is a necessity. D. H. Botchford, of Columbia Steel Company, San Francisco, said mill interests in San Francisco and Los Angeles had been seriously considering a blast-furnace on the Pacific Coast, and had made investigations regarding coal-deposits in Washington with view to coke-supply, but these were unsatisfactory; the only coal which met requirements was Carbonado, and uncertainty and cost of production made it almost prohibitive. Mr. Boothin, of Judson Iron and Steel Company, San Francisco, said he and associates had been considering this question with Puget Sound interests headed by Mr. Thane, which had paid a large sum for options on iron properties in which Mr. Boothin and wife and the Crockers had been interested. Nothing had come of the matter.

Mr. Rickard, of the *Mining and Scientific Press*, said the Noble Electric Smelting Plant had been started in Shasta County, Cal., but had not proven a success so far and was at present closed down. Mr. Smith, of the Smith-Emery Company, Chemical and Testing Engineers, who was Government Commissioner for Iron and Steel during the war, said there was not sufficient ore in Shasta County, where a great deal of money had been spent in experimenting with the electric furnace to justify the erection of a blast-furnace, although the quality of the ore was good.

Mr. Booth, manager of Judson Iron and Steel Company, said that if we had the coal and iron in British Columbia and could get a blast-furnace going we had the best business proposition on the Coast. Mr. Smith, of the Smith-Emery Company, San Francisco, a member of the Iron and Steel Institute of America, said he had covered the whole Pacific Coast from Mexico to British Columbia during the war, and had no hesitation in saying there was a market for output of a 400-ton blast-furnace, and if a plate-mill was added he would advise two 400-ton furnaces at least. Pig-iron, ship-plates, heavy shapes, I beams, channels, and angles were needed. At present California mills were exporting large shipments of what is known as "Bamboo steel" to China. A company, properly financed, should have no difficulty in attaining success when their plant was placed on a commercial basis. While he considered San Francisco offered great facilities, it might be more economical to locate farther north. Generally it was more economical to take the ore to the coal, and as British Columbia had the coking-coal, and also large deposits of high-grade iron ores, it seemed the logical place, as it would undoubtedly be cheaper to transport the finished product to the market rather than ship the raw material. The time was most opportune for commencement of a blast-furnace and heavy-plate mill.

Mr. Botchford, of the Columbia Steel Company, was decidedly of the opinion that a blast-furnace installation was a necessity. He considered present mills with good supply of pig-iron could take care of present local market for merchant bars and small angles and channels, and even have a small surplus for export. Whilst not sure that a plate-mill would pay from the start, he was of the opinion that a mill capable of turning out ship-plate and heavy I beams and shapes would follow installation of a blast-furnace plant. He could give the assurance, he said, that mill and foundry interests of the Pacific Coast would welcome and support such an undertaking. Mr. Booth, manager of Judson Iron and Steel Company, said, while he would not like to see a bar-mill in connection with a new plant, as local mills could probably take care of the local market, he considered there was an opening for a plate-mill for ship-plates, heavy shapes, I beams, and channels. He hoped a blast-furnace would be established with as little delay as possible, as undoubtedly a market existed for the product and the time was opportune for commencement of such a plant. Mr. Boothin, of the Judson Iron and Steel Company, concurred. He said there was a market for anywhere from 500 to 1,000 tons a day on the Coast, and he and associates would gladly assist and enter a business arrangement with any company prepared to commence at an early date. He thought part of the capital could be secured in San Francisco.

A. C. Denman, of Southern California Iron and Steel Works, Los Angeles, said a market existed in that district for the output of a 500-ton blast-furnace. His own plant would take 100 tons a day, and Mr. Hoswell, who represented the Los Angeles Foundrymen's Association, said cast-iron foundries of Los Angeles consumed 300 tons of pig per day. He agreed that British Columbia was the most suitable location for a plant. Having all water transportation, vessels could land the finished production as pig-iron or billets cheaper and more economically than by bringing ore and coke to the market. Moreover, if a supply of hematite ore was required, good hematite existed in Southern California and could be put on board the steamer at San Pedro at about \$4 per ton, providing return cargo for the boat landing the pig-iron. Mr. Denman said his firm used 1,500 tons of pig-iron a month and could use 3,000 tons if supply was available. He and Mr. Botchford, on behalf of the five steel and iron plants of California, gave the assurance that they were willing to enter a firm contract with a blast-furnace, even if established in British Columbia, to take 500 tons a day for a term of years if pig-iron could be delivered anywhere near present price of scrap steel—\$30 per net ton. They further said there would be nothing to fear from a high tariff being imposed, as business interests on the Coast would not stand for it. Delays in delivery and recent increase of railway freights made an iron and steel plant on the Coast an urgent necessity.

Mr. Hill, of Llewellyn Iron Works, Los Angeles, said his firm would gladly support establishment of a blast-furnace and mill and considered Southern California could consume the output of a 500-ton blast-furnace. Scrap steel was getting 'scarcer all the time, and if suitable pig-iron was obtainable they would use a large percentage.

J. J. Tynan, general manager, Bethlehem Shipbuilding Corporation, which builds many steel steamers and handles a large amount of ship repairs—it has an extensive plant, with four floating and one large graving dock, also a large cast-iron foundry and machine-shop—and is now building seven large tankers, one steamer, and several torpedo-boats, said his firm, though connected with the Bethlehem and Schwab interests in the East, would now welcome not only a blast-furnace on the Pacific Coast, but would also like to see a good ship-plate mill in operation. They would certainly buy from the plant. Now they were compelled to buy wherever they could get delivery. They buy all their steel castings principally from the Columbia Steel Company. Their present consumption of pig-iron is about 150 tons per month, blooms and billets about 200 tons per month, and 50,000 tons per year of general merchant steel, including plates, shapes, angles, and channels. Though at one time Mr. Schwab and others thought a steel plant on the Coast could not compete with the East and Orient, the war had brought a complete change of conditions, and Mr. Tynan considered there was excellent opportunity for such a plant, and if by having the coal and iron in British Columbia we could manufacture cheaper than on Puget Sound or California, then British Columbia was the logical place.

F. Baker, of Baker Iron Works, Los Angeles, which principally fabricated structural steel for bridge and building purposes, and also had a large foundry and machine-shop, said his firm bought merchant bar from local mills, and all plates, shapes, angles, I beams, and channels, as well as pig-iron, from Pittsburgh, and great inconveniences and losses by delays in delivery occurred, Eastern manufacturers always getting preference. Any *bona-fide* company starting a blast-furnace and heavy-plate mill would get whole-hearted support from his firm.

Mr. Burgess, general manager, Pacific Steel Company, San Francisco, said his company, producing 1,100 tons of merchant bar per month, all made from scrap steel costing \$27 to \$30 per net ton, would gladly use 30 to 40 per cent. suitable pig-iron if reasonable price and delivery could be depended upon. His company would gladly see a blast-furnace plant turning out pig-iron on the Coast. It was not concerned as to location; what they wanted was supply and reasonable delivery, and any one fulfilling those conditions would have their support.

The opinion of those interested in iron- and steel-working concerns in Washington and Oregon is that the time is opportune for the establishment of blast-furnaces and a steel plant, for which well-informed men state there is an ample market.

Mr. Scott, representative of Midvale Steel Company, of Pennsylvania, said that, notwithstanding that his company owned their own mills in the East, conditions were such now that some of his principals were very much in favour of a works on the Pacific Coast. He gave many instances of trouble and difficulties arising through congestion of orders, lack of cars for transportation and delivery. His candid opinion was that there was a market on the Pacific Coast for steel products amounting to over 2,000,000 tons a year; he had one customer good for 25,000 tons a year. The products would consist of structural steel, including boiler and marine plate, merchant bars, rounds, squares, and flats; steel rails up to 60 lb., also nail-rods and fence-wire. He considered the Coast market would take 300,000 tons of light rails, 600,000 tons of plates, 600,000 tons of bars, and 500,000 tons miscellaneous. The bars would include all soft machinery or mild steel and drill-steel, plates, marine, boiler, tank sheet plates, and structural steel, miscellaneous, nail-rods, fence-wire, etc.

Mr. Monteagle, president of Pacific Construction and Engineering Company, Seattle, said his company would gladly co-operate with any *bona-fide* company in the establishment of an iron and steel plant on the Coast. Heads of the Vulcan Iron Works, Seattle, were of the opinion that the time was opportune for establishing a plant. E. S. Harbauch, sales agent of the United States Steel Products Company, who admitted that requirements of Coast States was from 750,000 to 1,000,000 tons a year of all grades, including light rails, structural steel, reinforcing steel, merchant bar, tank and ship plate, but was doubtful if the time was ripe for a Coast plant; the United States Steel Company had always so far anticipated the market, he said, instancing such places as Garry, Duluth, and the Canadian plant in Ontario, and if there was opportunity he thought the company would take advantage of it. He admitted, however, the tin-plate industry would stand investigation, there being a market for probably 200,000

tons a year; mining, drill, and tool steel might also be considered, but he doubted if it would be profitable to compete in such lines as steel rails, ship-plate, beams and shapes such as I beams, channels, and even heavy merchant bar or ingots and billets, owing to wide diversity of sections to the amount consumed. He thought, however, the time was drawing near when a works would be a necessity on the Coast.

S. C. E. Smith, manager, Smith-Watson Engineering Company, Portland, considered an iron and steel works on the Coast would be a direct and infinite benefit and hoped that a works would be started. Mr. Cullers, manager, North West Steel Company, Portland, said he was pessimistic so far as a steel-works on the Coast was concerned, as he doubted whether ore, coal, and limestone existed to warrant establishment. On being asked his opinion, if assured that the raw materials did exist, he said he would be enthusiastically in favour. He said: "If you have the iron ore, the coal and fluxes, then there is no doubt about the market." B. C. Ball, president, and H. T. Humphrey, manager, Willamette Iron Works, Portland, said the establishment of a plant which could compete with Eastern mills at reasonable cost and delivery would be a great benefit to manufacturers and stimulate other business. Mr. Morris, superintendent, Puget Sound Iron and Steel Company, Tacoma, said they were greatly handicapped by having to ship all their material from the East at a freight of \$20 to \$25 per ton, and were often held up for weeks in delivery, and an iron and steel works on the Coast would be not only of infinite benefit to manufacturers now in existence, but would stimulate establishment of many others. Mr. Eves, superintendent of Tod Shipbuilding Company, Tacoma, was heartily in support; he said if steel-shipbuilding was to continue on the Coast the material would have to be manufactured from our own raw material here. John Hartman, proprietor of Atlas Foundry, Tacoma, complained of the high costs and delay in getting material from the East and was strongly in favour of steel-works on the Coast. F. M. Foley, Griffen Wheel Works, said a steel-works could not be started too soon; the high freights and delay in getting material was a serious question, and his firm was compelled to refuse business on that account. He thought the time opportune for establishment of steel-works if we are satisfied as to the iron ore, coke, and limestone in quantities to justify it; the market was here and steadily increasing.

Mr. Wylie, of Tod Dry Dock Company, Seattle, said that in 1916 he with a number of men in Seattle, Tacoma, and San Francisco, including the manager of the Bethlehem Steel, offered Mr. Piggott, of Pacific Steel Company, a contract for 250,000 tons of ship-plate at the same cost they were paying in the East, but Mr. Piggott could not make it go. Mr. Wylie thought the time opportune for a Coast steel plant. George Danz, manager, Hoffus Steel Company, Seattle, considered a plant on the Coast would be a distinct advantage both to manufacturer and consumer. W. B. Hund, Eastern buyer of A. M. Castle & Co., dealers in iron and steel, said, while they were directly interested in mills in the East, owing to congestion of business and difficulty in getting delivery they bought largely from Pacific Iron and Steel Works, Seattle; although it might not appear in the interest of their company, he considered a steel-works on the Coast would fill a long-felt want.

METAL-WORKING PLANTS ON PACIFIC COAST.

There are a large number of metal-working plants on the Pacific Coast which at present, in addition to other material, consume approximately 1,000 tons of pig-iron and would use much more if it was procurable at a reasonable price.

Six plants, five in California and one in Washington, are engaged in manufacturing steel in open-hearth furnaces, producing 31,000 tons per month, about 65 per cent. merchant bar, $\frac{1}{4}$ to 4 inches, in rounds, squares, and flats, and reinforcing-bars, $\frac{1}{4}$ to $1\frac{1}{4}$ inches, and the balance angles up to 6 inches and beams and channels up to 8 inches. These mills now use about 96 per cent. scrap and 6 per cent. pig-iron, and would use 40 to 50 per cent. pig-iron if obtainable.

California has twenty-one iron-foundries, employing 2,300 men, using 30 to 50 per cent. pig-iron, the balance scrap, consuming about 4,500 to 5,000 tons of pig-iron per month. They could use at least 200 tons per day of pig-iron. The five steel-making plants are willing to enter into a contract at present for 500 tons of pig-iron a day. Other metal-working plants,

such as the Bethlehem Shipbuilding Corporation, now using 150 tons pig-iron, 200 tons of blooms and billets, and 50,000 tons of plates and shapes per annum; Baker Iron Works, of Los Angeles, engaged in fabricating structural steel for bridge and building purposes, with engineering-works, machine-shops, etc., would increase the market.

In Washington data compiled by the Seattle Chamber of Commerce shows present consumption of pig-iron would be about 75,000 to 100,000 tons a year. The only plant now manufacturing steel in open-hearth furnaces is the Pacific Steel Company, with normal output of 4,000 tons per month. This plant uses mostly scrap and a small percentage of magnetite from a deposit owned by the company on Texada Island. The engineering, forging, and manufacturing plants, car wheel and axle, and other plants and foundries and machine-shops consume a considerable amount and offer a growing market for pig-iron.

Oregon has thirty-five iron- and steel-working plants, of which thirty-three are foundries; the consumption of this State at present being estimated at 100,000 tons per year.

British Columbia has seventeen plants, ship-building yards, engineering and other works engaged in iron- and steel-working industries, in addition to a number of foundries, machine-shops, and smaller plants, now consuming 3,010 tons of pig-iron and offering a market for much more if available: 6,050 tons of scrap cast-iron; 1,190 tons of scrap steel; 163 tons of billets; 1,825 tons of merchant bar; 15,270 tons of ship, tank, and boiler plate; 8,715 tons of angles and shapes; 2,500 tons of rivets and rivet-bars; and 200 tons of structural steel a year.

BRITISH COLUMBIA.

While I have endeavoured to get as near as possible to the actual consumption of pig-iron in British Columbia, I do not think the returns given by the various foundries offer a fair criterion as to what the actual consumption would be if a blast-furnace plant was in operation in the Province and pig-iron procurable as a result at a reasonable price. The abnormal amount of cast scrap used is evidence of this. The increase in the cost of pig-iron since 1912 from, let us say, an average of \$30 to over \$70 compelled foundrymen to use scrap wherever possible.

The combined consumption of pig-iron and cast scrap in 1920 was approximately 9,060 tons.

According to data furnished by the Minister of Customs, Ottawa, the quantity and value of pig-iron imported into British Columbia for the fiscal year 1912 was 7,648 tons, valued \$102,736; this value, of course, being the f.o.b. price, Liverpool, and not the selling-price here. If British Columbia could use practically 8,000 tons of imported pig-iron in 1912, it is reasonable to conclude that, owing to the increase in the industrial life of the Province, the requirements of pig-iron should be at least 15,000 to 20,000 tons per annum; and that bears out my own personal observation and conclusion that present consumption of pig-iron in British Columbia will approximate 50 tons per day. When it is considered that in 1910 the consumption of pig-iron was only 2,000 tons the increase is remarkable.

The total quantities of the products of iron and steel imported in British Columbia for the fiscal year ending March 31st, 1912, was 58,674 tons, the invoice value of which was \$1,988,701; for the nine months ending December 31st, 1917, the value of the principal items of iron and steel entered for consumption through ports of British Columbia was: Dutiable, \$3,988,159; free, \$1,664,576; a total of \$5,652,735. This shows a great increase in consumption of products of iron and steel during the past five or ten years, and taken in conjunction with the greater market to the south, and across the Pacific to the Orient and Australasia, forms an interesting basis for any one contemplating establishment of an iron and steel industry in British Columbia.

The following table shows present consumption by foundries and metal-working plants of British Columbia :—

Table A.—Present Consumption reported by British Columbia Plants.

Plant.	Pig-iron.	Case-iron Scrap.	Steel Scrap.	Billets.	Merchant Bar.	Ship, Tank, and Boiler Plate.	Angles and Shapes.	Rivets and Rivet-bars.	Structural Steel.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Wallace Shipbuilding & Drydock Co., Ltd., North Vancouver..	500	2,000	....	60	500	12,000	6,000	....	...
J. Coughlan & Sons, Ltd., Vancouver .....	....	....	....	50	....	400	....	2,400	200
Vulcan Iron Works, Vancouver.	200	500	....	....	100	1,500	50	....	...
Canadian Northwest Steel Co., Ltd., Vancouver .....	....	....	....	....	50	1,000	1,950	....	...
Ross & Howard Iron Works, Vancouver	400	350	50	....	125	50	150	....	...
Yarrows, Ltd., Victoria	100	150	....	50	200	250	100	....	...
Victoria Machinery Depot, Victoria	100	200	....	....	250	250	100	....	...
Heaps Engineering Co., Ltd., New Westminster	300	600	....	....	50	.....	30	....	...
Westminster Iron Works, New Westminster .....	....	....	....	3	100	50	75	....	...
Boundary Iron Works, Grand Forks	50	250	....	....	....	.....	....	....	...
Nelson Iron Works, Nelson ...	150	200	....	....	100	.....	50	....	...
Mainland Engineering Co., Vancouver	150	350	....	....	50	.....	....	....	...
Sumner Iron Works, Vancouver	100	200	....	....	....	.....	....	....	...
Vancouver Machinery Depot, Vancouver .....	....	....	....	....	50	20	10	....	...
Vancouver Engineering Works, Vancouver	500	400	300	50	200	200	200	100	...
Opsal Steel Co., Vancouver	10	....	840	....	50	.....	....	....	...
Hutchison Bros. & Co., Ltd., Victoria	150	250	....	....	....	.....	....	....	...
Miscellaneous foundries	300	600	....	....	....	.....	....	....	...
Totals	3,010	6,050	1,190	213	1,825	15,720	8,715	2,500	200

IRON- AND STEEL-WORKING INDUSTRIES OF BRITISH COLUMBIA.

Wallace Shipbuilding & Drydock Co., North Vancouver, is one of the pioneer ship-building and ship-repairing firms, Mr. Wallace having been in business for over twenty years. In 1907 an order was secured for a steel freight for English interests—a steamer of 5,000 tons—and since and particularly during the war this yard built a number of steamers, as well as carrying out considerable repair-work. At present two steamers are being built for the Dominion Government and a passenger-steamer for the Canadian Pacific Railway steamship service in British Columbia waters. The yard consumes now about 500 tons of pig-iron, 2,000 tons of scrap, 60 tons of billets, 500 tons of merchant bar, and 18,000 tons of structural steel per annum.

J. Coughlan & Sons, Vancouver, a firm established for fabricating structural steel for building purposes, took up ship-building in 1907, becoming very active during the war. Many steamers—over fifteen—up to 8,800 tons dead weight each, were built, and the firm has considerable work on hand, including two steamers for the Dominion Government. This firm has secured a contract from the Dominion Government for a large graving-dock at Vancouver, which carries a subsidy, and will then be in a position to undertake ship-repair work of any size. At present this firm, which has a large machine-shop, has no cast-foundry, iron castings being procured principally from the Wallace Foundry and heavy steel castings from Seattle and San Francisco, and light steel castings from the Opsal Steel Company or Vancouver Engineering Works. Mr. Coughlan, Sr., has been in business over thirty years in British Columbia. Present

consumption per annum is about 200 tons of structural steel, 50 tons of billets and ingots, 200 tons of ship and boiler plate, 200 tons of tank-plates, and 2,400 tons of rivets and rivet-bars.

Vulcan Iron Works, Vancouver, commenced business about fifteen years ago at New Westminster, manufacturing logging and sawmill boilers, and later started building marine boilers. Most of the boilers for steamers built at the Wallace and Coughlan yards were built by this firm, and several boilers are now in hand for those two firms. The firm also constructs all kinds of tanks and digesters for pulp and paper mills. Present consumption is about 100 tons of pig-iron, 500 tons of scrap, 100 tons of merchant bar, 1,500 tons of ship and boiler plate, and 35 tons of structural shapes per year.

Canadian Northwest Steel Co., Vancouver, was originally a branch of Northwest Steel Company, of Portland, Ore., but is now a separate concern. Principal business is fabricating of structural steel for buildings and bridges. Annual consumption is about 50 tons of merchant bar, 1,000 tons of ship and boiler plate, and 1,950 tons of structural shapes.

Ross & Howard Iron Works, Vancouver, established about 1890 by John Ross, Sr., and Jas. Howard, has since carried on business of ironfounders and general machine-shop work. Present plant consists of machine-shop and large cast-iron foundry. During the building boom a considerable business was done in fabricating structural steel. They also build land- and logging-engine boilers. Present consumption (annual) is 400 tons of pig-iron, 250 tons of cast scrap, 50 tons of steel scrap, 125 tons of merchant bar, 50 tons of ship and boiler plate, and 150 tons of structural steel.

Vancouver Engineering Works, Vancouver, was established over twenty years ago by Armstrong & Morrison principally for manufacturing steel pipe for water and hydraulic purposes. Later it was acquired by Colon F. Jackson and associates, who extended the business into engineering manufacturing. In addition to large machine and boiler shops, a cast-iron foundry and also a Bessemer cast-steel foundry is operated. It is practically the largest industry of the kind in the Province and would be in a position to extend the business very considerably if pig-iron could be purchased in the Province at a reasonable price. Present consumption per annum is about 500 tons of pig-iron, 400 tons of cast scrap, 300 tons of steel scrap, 50 tons of billets, 300 tons of merchant bar and steel, including rivet-steel, 200 tons of ship and boiler plate, and 200 tons of structural shapes.

Opsal Steel Co. was established some years ago principally for manufacturing logging tools and lumbering equipment generally. When first established castings were purchased outside, principally from Sheffield. About four or five years ago an electric furnace was installed and castings are now being made by this process for the firm's own use and for the trade, principally from scrap steel. About 10 tons of pig-iron and 840 tons of scrap is being used at present per annum.

Mainland Engineering Co., Vancouver, has been established for some years and does a very fair business in marine- and logging-engine repair-work. Present consumption per annum is about 150 tons of pig-iron.

Sumner Iron Works, Vancouver, uses about 100 tons of pig-iron and 200 tons of scrap per annum.

Vancouver Machinery Depot, Vancouver, carries a large stock of second-hand machinery and has a machine-shop in connection with the warehouse, whereby alterations and repairs are made to logging-engines and other machinery. The firm also is agent for manufacturers of logging and other machinery in Seattle and San Francisco. Its annual consumption is about 50 tons of merchant bar, 20 tons of boiler-plate, and 10 tons of structural shapes.

Heaps Engineering Co., New Westminster, carries on the business of building logging, sawmill, and other machinery. Present consumption per annum is about 300 tons of pig-iron, 600 tons of scrap, and 80 tons of merchant bar, plate, and shapes.

New Westminster Iron Works, New Westminster, has been in operation for a number of years. Principal business is repair-work, and the firm does not enter to any extent into construction of new machinery. It uses about 3 tons of billets, 100 tons of merchant bar, 50 tons of plate, and 75 tons of shapes per year.

Yarrows, Ltd., Victoria.—This firm was originally carried on by Messrs. Bullen, Limited, as engineers and ship-repairers and was bought out by Yarrows, Limited, about ten years ago. Several steamers of both wood and steel have been built, as well as transfer-barges of steel for the Canadian Pacific Railway Company. The firm has not entered to any extent in the building

of large steamers during the war, but secures a large percentage of the repair-work, using in conjunction with its marine railway the Government dry-dock at Esquimalt. Present annual consumption is about 100 tons of pig-iron, 150 tons of scrap, 50 tons of billets, 200 tons of merchant bar, 250 tons of plate, and 100 tons of shapes.

Victoria Machinery Depot, Victoria, established over twenty years, has been engaged in general engineering, such as building of logging and sawmill machinery and small marine engines and boilers. Recently a steel-shipbuilding yard was added under the name of the Harbour Marine Company, Limited, and several steel steamers were built for the Dominion Government. Consumption of pig-iron is about 100 tons; scrap, 200; merchant bar, 250; plate, 250; and shapes, 100 tons.

Hutchison Bros & Co., Ltd., Victoria, engages in general engineering construction, annual consumption being about 150 tons of pig-iron and 250 tons of scrap.

Boundary Iron Works, Grand Forks, have an iron-foundry established about the time the Granby smelter was built in Grand Forks, and supplied castings to various mines in the district as well as to the smelters.

Nelson Iron Works was established over twenty years ago by Mr. Hinton, who was later joined by Mr. Cunliffe, who at the time was running a small works at Rossland. This firm does an extensive business in repairing mining machinery and equipment, and uses about 150 tons of pig-iron, 200 tons of scrap, and 150 tons of merchant bar and general structural steel per annum.

In addition to the foundries and plants mentioned, there are a number of small machine-shops which have small cupolas in connection with the motor-boat and automobile business where they make their own castings. Consumption of these foundries would run approximately 100 tons of pig-iron and 150 to 200 tons of scrap per annum.

STATE OF WASHINGTON.

According to data compiled by the Seattle Chamber of Commerce, consumption of pig-iron alone in Washington would be from 75,000 to 100,000 tons per year. The only plant now manufacturing steel in open-hearth furnaces, mostly from scrap—a small percentage of magnetite-iron ore is used, secured from Texada Island—is the Pacific Steel Company, Seattle. There are a number of other plants designated iron and steel works, as are many foundries and machine-shops on the Coast, but this designation is misleading. They are mechanical engineering-works manufacturing engines and boilers, logging-engines, marine engines, and doing general repair-work. Some have an iron-foundry in connection with the plant and some have not.

The Pacific Steel Company, Seattle, have four 40-ton open-hearth furnaces, all installed since 1916. Their capacity equals 10,000 tons per month and during the war and ship-building boom were kept fully employed. Since the cessation of ship-building output has fallen off. Normal output will not exceed 4,000 tons per month, for which two furnaces will more than suffice. The product is merchant bar, or what is known as soft machinery steel, in rounds from ¼ to 3½ inches, also squares and flats from ¼ to 8 inches and 1½ to 8 inches. They also roll angles up to 6 inches. The plant makes its own billets from scrap, using a small percentage of magnetic-iron ore from a small deposit owned by the company on Texada Island, B.C. During the ship-building boom the shipyards produced about 50,000 tons of scrap per month, which has now ceased, and some of the mills are closed down for lack of scrap.

Other than the Pacific Steel Company, the principal iron- and steel-working plants of Washington have the following normal consumption at present:—

Plant.	Pig-iron.	Scrap.	Billets.	Merchant Bar.	Angles and Shapes.
	Tons.	Tons.	Tons.	Tons.	Tons.
Seattle Pacific Construction Co. ....	.....	.....	12,000	...	...
Washington Iron Works	5,000	5,000	100	...	...
Vulcan Iron Works, Tacoma	7,500	6,000	.....	...	...
Puget Sound Iron & Steel Works	1,800	1,800	.....	150	50
Atlas Foundry	500	500	.....	...	...
Griffen Wheel Co.	2,000	1,500	.....	800	...
Miscellaneous foundries	75,000	.....	.....	...	...
Totals	91,800	14,800	12,100	950	50

W. G. Oves, Industrial Bureau Secretary, Spokane Chamber of Commerce, furnished the following estimate of approximate consumption in the Inland Empire district of Washington:—

	Tons.
Light rails	500
Merchant bars	3,000
Structural steel	500
Angles, channels, and shapes	500
Tank plates and sheets	1,000
Boiler-plates	100
Tin-plate	1,000

PLANTS IN WASHINGTON.

The Pacific Construction & Engineering Co., Seattle, is a well-equipped forging plant with twenty-one heating-furnaces, oil-fired, and three hydraulic forging-presses. During the ship-building boom consumption of ingots and billets was about 25,000 tons a year; the normal consumption is placed at about 12,000 tons a year, with a steadily growing increase. This plant cost about \$500,000. It is equipped with a huge travelling crane running the whole length of the shop and serving the furnaces and forging-presses. Ingots and billets from 6 to 54 inches square or diameter are handled, and one ingot handled weighed 51 tons. The work turned out is varied considerably. The machine-shop is fitted with modern high-speed lathes capable of turning and finishing the largest shafting. The forgings include stern and rudder frames for the largest steel steamers. Mr. Monteagle, president of the company, states he is anxious to co-operate with any bona-fide company in the establishment of an iron and steel plant on the Coast.

Washington Iron Works, Seattle, is a general engineering company, the principal product being logging-donkeys, small marine and stationary work. Consumption of pig-iron is from 300 to 500 tons per month, according to nature of the work and the proportion of scrap. The pig costs approximately \$45 per ton f.o.b. East. This plant also consumes from 60 to 100 tons of billets per year. The consumption of scrap, cast, is about equal to that of pig-iron. Mr. Frank, manager, considers that an iron and steel plant on the Coast would greatly benefit the manufacturing concerns not only from a cheaper cost standpoint, but also from a delivery standpoint.

Vulcan Iron Works, Seattle, a manufacturing concern with an extensive foundry with melting capacity equalling 100 tons a day, consumed about 50 tons of pig-iron daily during the ship-building boom and now uses about 25 tons per day and a like amount of scrap. This plant handles a large quantity of structural steel and merchant bar. The management computes the consumption on the Pacific Coast will easily approximate 2,000,000 tons a year, and considers the time opportune for establishing iron and steel works on the Coast.

Puget Sound Iron and Steel Works, Tacoma, manufactures engines and boilers, logging-engines, marine engines, and does general repair-work. A cast-iron foundry is operated in connection with the plant. Castings for sawmills are also turned out. Consumption of pig-iron is about 150 tons per month and business is steadily increasing. A like amount of scrap is used. Merchant bar, principally round bars for shafting, is consumed to extent of about 12 tons per month and about 50 tons of I beams per year. Mr. Morris, the superintendent, said they were greatly handicapped by having to ship all their material from the East at freight cost of \$20 to \$25 per ton, and often were held up for weeks in delivery. He considers establishment of an iron and steel works on the Coast would not only be of infinite benefit to manufacturers now operating, but would stimulate many new establishments.

Hofius Steel Co., Seattle.—Details of consumption of iron and steel by this plant were not obtainable. George Danz, manager, said an iron and steel plant on the Coast would be of distinct advantage both to manufacturers and consumers. He considered a start should be made with manufacture of pig-iron, as it was the base of all industries and the market sure. The many different sections and sizes in structural steel and merchant bar would necessarily entail large expenditure in rolls and the carrying of considerable stock to ensure quick delivery,

as success would depend on not only being able to undersell the Eastern competitor, but to give prompt delivery; the trouble at present was more in connection with delivery than price. There was a large amount of tin-plate used on the Coast, but tin-plate was sold on a brand, and any new concern would not only have to guarantee quality, but would for a time have to put up bonds against their guarantee, which would require large capital. However, the market is not only here for tin-plate, but the tin goes through here to the East for manufacture and is shipped back in sheets, paying double freights. Therefore there is good opening for a tin-plate mill. The Coast market for structural steel, tank-plate, and merchant bar, including reinforcing, also light rails, might run to 1,500,000 tons for the three Coast States.

Atlas Foundry, Tacoma, is a purely cast-iron foundry, consuming over 500 tons of pig-iron a year and about the same amount of cast-iron scrap. The scrap is becoming hard to procure and more pig-iron will be required in future. Mr. Hartman, manager, says the high cost of material and delay in getting it from the East strongly favours a steel-works on the Coast.

Griffen Wheel Co., Tacoma, manufactures chilled cast-iron wheels and axles for railway freight-cars and electric-railway cars, also mining-car wheels and axles. Average annual consumption of pig-iron is about 2,000 tons a year. About 500 to 600 tons per year of mild-steel bars are used for mining and other car axles and about 200 tons a year for railway-car axles. This company is building an addition to its plant and will increase its consumption of both pig-iron and bars considerably. At present, in addition to the pig, about 2,000 tons a year of scrap is used. Mr. Foley, manager, thinks the time opportune for a steel-works if the iron ore, coke, and limestone supply is assured; the market is here and is steadily increasing.

The Crucible Steel Co., Seattle, supplies mining and machine shops with drill and tool steel. The manager stated that California, including the oilfields, consumed not less than 2,000 tons per year; Washington, 500 tons; Oregon, 350 tons; Alaska, 250 tons per annum. If steel-works were established on the Coast the manufacture of crucible steel, tool-steel, and tin-plate would naturally follow and be important subsidiaries.

Todd Drydock and Shipbuilding Co., Seattle.—Mr. Wylie, manager, was unable to give in detail the consumption of iron and steel. He said that in 1916 he, with a number of men in Seattle, Tacoma, and San Francisco, including the manager of the Bethlehem Steel Company, offered Mr. Piggott, of the Pacific Steel Company, of Seattle, a contract for 250,000 tons of ship-plate at the same cost they were paying in the East, but he was unable to undertake the work. Mr. Wylie considers the time opportune for commencement of a blast-furnace and ship-plate mills on the Pacific Coast.

Representatives of Eastern Companies and Jobbers.

Mr. Scott, representative of Midvale Steel Company, of Pennsylvania, said the market on the Pacific Coast for steel products exceeds 2,000,000 tons a year; he had one customer for 25,000 tons a year. The Coast market would take 600,000 tons of plates—marine, boiler, and tank sheets and structural steel; 600,000 tons of bars, rounds, squares, and flats, and including soft machinery or mild steel and drill-steel; 300,000 tons of steel rails up to 60 lb.; and 500,000 tons of miscellaneous—nail-rods, fence-wire, etc. Notwithstanding that the company owned its own mills in the East, he said conditions were such now that some of his principals were much in favour of a works on the Pacific Coast. He gave many instances of trouble and difficulties arising through congestion of orders and lack of cars for transportation and delivery, and offered every assistance, including the address of one of his associates in Pittsburgh, who would become interested in a plant on the Coast.

A. M. Castle & Co., Seattle, jobbers and dealers in heavy hardware, iron, and steel. Mr. W. B. Hunt, the Eastern buyer, said the company's normal consumption of tank, flange, marine plate, and merchant bar is 750 tons per month. While directly interested in mills in the East, owing to congestion of business and difficulty in getting delivery, the company bought largely from the Pacific Iron and Steel Works, Seattle; he showed shipping bills for three car-loads bought from this source the previous week. Although it might not appear in the interest of their company, he considered a steel-works on the Pacific Coast to manufacture our raw material into the finished product would fill a long-felt want.

Karl S. Harbauch, sales agent, United States Steel Products Company, a branch of the United States Steel Company, who was cautious and conservative in his remarks, admitted requirements of the Coast States would aggregate 750,000 to 1,000,000 tons of all grades, including light rails, structural steel, reinforcing-steel, merchant bar, tank and ship plate, and sheet iron. He doubted if the time was ripe for works on the Coast, basing his opinion on the fact that the United States Steel Company had always so far anticipated the market and established works, instancing such places as Garry, Duluth, and the Canadian plant in Ontario. He thought, if there was an opportunity, his company would not hesitate to take advantage of it. He admitted, however, the tin-plate industry would stand investigation. There was a market on the Coast for probably 200,000 tons per year; mining, drill, and tool steel might also be considered. He doubted if it would be profitable to compete in such lines as steel rails, ship-plates, beams and shapes such as I beams, channels, and even heavy merchant bar or ingots and billets, owing to the wide diversity of sections in the amount consumed. He thought, however, the time was drawing near when a works would be a necessity on the Coast.

OREGON.

Oregon has thirty-five iron- and steel-working plants, of which thirty-three are foundries. Consumption of pig-iron in this State is equal to 100,000 tons per year.

Willamette Iron Works, Portland, has the following consumption of iron and steel: Tanks and boiler-plates, 10,000 tons; shapes, 500 tons; bars, 1,500 tons; rivets, 1,000 tons; billets, blooms, and forgings, 500 tons; boiler-tubes, 1,000 tons; sheets, 250 tons; pig-iron, 1,500 to 2,000 tons. This is the normal consumption. During the war it was much greater, and the company now has a contract for water-pipe installation which will take about 3,000 tons, but the difficulty is to get this material in reasonable time. During the war this firm turned out more marine boilers than any other firm in the United States. B. C. Ball, president, and H. T. Humphrey, manager, both were of the opinion, with the business on the Coast steadily increasing, that establishment of an iron and steel works on the Coast which could compete with Eastern mills at reasonable cost and delivery would be a great benefit to manufacturers and stimulate other business.

Smith Watson Engineering Co., Portland, consumed 1,500 tons of pig-iron last year, 2,000 tons of scrap, and consumption of mild steel runs from 200 to 300 tons a year. Business was steadily growing. S. C. E. Smith, manager, considered a Coast iron and steel plant would be of direct and infinite benefit to the manufacturer, and he hoped a works would be started. He would not hazard an estimate of aggregate consumption of all grades of iron and steel on the Coast, but admitted it must be considerably over 1,000,000 tons.

Northwest Steel Co., Portland.—This company has no foundry. Its consumption of structural steel was about 1,500 tons per month, including angles, shapes, beams, and plates, and 500 tons of rivet-bars. The company has contracts for seven steel oil-tank steamers of 12,000 tons each, and will consume 35,000 tons of plates and shapes in building these during the next sixteen months. His opinion was that they would continue to build steel vessels, and if steel for these can be made on the Coast it would undoubtedly help the industry. Freight on the material was now costing \$22.50 per ton.

A. C. Callan, general broker and importer, Portland, said jobbers in Oregon handle over 20,000 tons of merchant bars a year, 1,500 to 2,000 tons. He estimates Washington will handle 30,000 to 50,000 tons of merchant bar and considerably more rails. Relaying rails were practically unobtainable now and there was a much greater demand for new rails up to 60 lb. He considered an iron and steel plant would be of great benefit to the Coast.

Mr. Crawford, Industrial Commissioner, Portland Chamber of Commerce, furnished the following list of cast-iron foundries in Oregon:—

Name of Foundry.	Location.	Capacity of Pig-iron per Day. Tons.
Peninsula Iron Works	Portland	20
Wood-Ewing Iron Works .....	.. .....	31½
Independent Foundry Co. ....	.. .....	50
American Marine Iron Works .....	.. .....	17
Marine Iron Works .....	.. .....	1
Smith-Watson Iron Works .....	.. .....	30
John Wood Iron Works .....	.. .....	7
Pacific Iron Works .....	.. .....	10
Crawford & Dougherty .....	.. .....	5
J. M. Leach Iron Works .....	.. .....	4
Hesse Martin Iron Works .....	.. .....	10
Beaver Foundry & Machine Works .....	.. .....	11¼
Phoenix Iron Works .....	.. .....	8
Liberty Foundry .....	.. .....	7
Oregon Iron & Steel Works .....	.. .....	25
Portland Stove Works .....	.. .....	10
O.W.R. & N. Shops .....	.. .....	10
Commercial Iron Works .....	.. .....	5
Beaver State Motor Co.	Gresham	11½
Vaughn Motor Works .....	.. .....	3
Cocs Bay Iron Works	Marshfield	2
Astoria Marine Iron Works	Astoria	10
Ashland Iron Works	Ashland	15
Anerson Steel Furnace & Boiler	Salem	1
Cross Bros'. Iron Works	Eugene	1
Albany Iron Works	Albany	31½
W. F. Rogers' Foundry	Bandon	5
Scow Bay Iron and Brass Works	Astoria	4
Dallas Iron Works	Dallas	13¼
Vancouver Iron Works	Vancouver, Wash.	5
Salem Iron Works	Salem	3
Shofner Iron Works	Rainier	11½
Huffs Schmidt & Dougan	Bend	4
Hiner & Reed	Tillamook	11½
Willamette Iron & Steel Works	Portland	5
Northwest Steel Co. ....	.. .....	.....
Total .....	.....	291½

Table B.—Present Consumption reported by Oregon Plants.

Plant.	Pig-iron.	Cast-iron Scrap.	Billets.	Merchant Bar.	Ship, Tank, and Boiler Plate.	Angles and Shapes.	Rivets and Rivet-bars.	Structural Steel.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Willamette Iron Works.....	1,500	1,500	500	1,500	10,250	500	1,000	.....
Northwest Bridge & Iron Co. ..	.....	.....	.....	.....	.....	.....	6,000	18,000
Smith-Watson Engineering Co...	1,500	2,000	.....	300	.....	.....	.....	.....
Miscellaneous foundries (35) ..	90,000	90,000	.....	.....	.....	.....	.....	.....
Totals	93,000	93,500	500	1,700	10,250	500	7,000	18,000

In reply to a questionnaire on the demand for malleable castings in Portland, Ore., the following statement was furnished by the Chamber of Commerce:—

No. of Reply.	Lb. per Year used at Present.	Lb. which could be used if readily available per Year.	Remarks.
1.....	2,000	30,000 to 40,000	Small and medium castings used.
2.....	1,000 (approx.)	3,000 (approx.)	Castings for general use.
3.....	200,000	200,000	10 lb. and under, agricultural implements.
4.....	8,000	12,000	Mostly small; street-car truck.
5.....	15 tons	.....	About 5 lb. each in size used.
6.....	Very few	.....	Use considerable quantity of stamped hardware for trunks, etc.
7.....	None	2,400 (approx.)	Small castings for washing-machines.
8.....	3,000 to 5,000	5,000 to 6,000	Used for devices and machines for mill-saws.
9.....	10,000	15,000	Small castings used in Willamette logging-engines.
10.....	20,000	.....	Used for chairs.
11.....	.....	6,000	Mostly small for drag-saws.
12.....	60,000	80,000	Logging and general purposes.
13.....	2,000	5,000 (if right price)	Various used, large and small.
14.....	400,000	500,000	Malleable cast-pipe fittings, 1/8 to 6 inches.
15.....	.....	.....	Considerable quantity if price right; small castings for furniture used.
16.....	150,000	150,000	Used for portable drag-saws; average about 10 lb.
17.....	10,000	15,000	Used for machine-manufacturing.
18.....	6,000	6,000	Used for auto and wagon repairs.
19.....	None	1,000 to 2,000	Used for hoist and gear parts; considerably more used if price right.
20.....	10,000	60,000	Small; miscellaneous supplies.
21.....	200,000	350,000	Used for railroad-cars.
22.....	None	Several tons	Sawmill and paper-mill work.
23.....	"	500	Used for beds.
24.....	.....	.....	In need of malleable cast; can give more or less business.
25.....	None	2,000	Used for small elevator parts.
26.....	.....	.....	Used for window-weights.
27.....	.....	.....	Very small business.
28.....	25,000	25,000	Used for tanks; about 1 lb. each.
30.....	.....	Questionable	Quantity used depends upon contracts in hand.
31.....	25,000	30,000	Use small cast; in need of malleable castings.
32.....	.....	50,000	Use 1/2 to 50 lb. in size.
33.....	.....	.....	Not much use for cast, but in sympathy for such a factory.
34.....	.....	.....	In favour of local concern, but not much use for cast; use small castings.
34.....	2,000	4,000	
35.....	None	None	Use steel instead of malleable.
36.....	"	"	
37.....	"	"	Quantity would depend upon price.
38.....	"	"	Do not use malleable cast.
39.....	"	"	Business does not require any.
40.....	"	"	
41.....	"	"	
42.....	"	"	
43.....	"	"	
44.....	"	"	May use some next year.
45.....	"	"	Would do good business.

CALIFORNIA.

California steel and iron plants offer a steady market for at least 1,000 tons per day of pig-iron. In San Francisco and Los Angeles sections are five steel and iron mills operating seventeen open-hearth furnaces, with capacity from 25 to 50 tons, a total capacity of 635 tons. They produce 27,000 tons a month; 65 per cent. merchant bars, 1/4 to 4 inches, in rounds, squares,

and flats, and reinforcing-bars from ¼ to 1¼ inches; 35 per cent. angles up to 6 inches, and I beams and channels up to 8 inches. These mills are:—

Company.	Furnaces.	Capacity.	Monthly Output.
		Tons.	Tons.
San Francisco—			
Pacific Coast Steel Co.	3	50	Over 10,000
Pacific Coast Steel Co.	3	40	
Columbia Steel Co.	3	25	About 6,000
Judson Iron & Steel Co.	3	30	Over 5,000
Los Angeles—			
Southern California Iron & Steel Co.	3	40	3,000
Llewellyn Steel Co.	2	40	3,000

These mills use scrap, approximately 1,500 tons a day, consuming about 94 per cent. scrap and 6 per cent. pig-iron. Scrap costs from \$27 to \$30 a ton f.o.b. San Francisco, and is hard to get at that. The price is \$2 lower at Seattle. Managers say that they would use at least 10 to 25 per cent. more pig-iron if obtainable at reasonable cost.

The Columbia Steel Company have also a large cast-steel foundry, capacity of which is about 1,500 tons per month. They supply heavy steel castings, such as stern and rudder frames, and heavy engine castings, not only to shipyards of San Francisco and Los Angeles, but also to shipyards of Portland, Tacoma, Seattle, Victoria, and Vancouver.

There are twenty-five iron-foundries, employing 2,300, using 30 to 50 per cent. pig-iron, the balance scrap, consuming 4,500 to 5,000 tons of pig-iron monthly at present. They could use at least 200 tons of pig per day. Other plants, such as Bethlehem Shipbuilding Corporation, now using 150 tons of pig, 200 tons of blooms and billets, and 50,000 tons of plates, shapes, angles, and channels, and Baker Iron Works, of Los Angeles, engaged principally in fabricating structural steel for bridge and building purposes, also a large machine-shop and foundry, would add to the market. Steel and iron workers interviewed in San Francisco District concur that there is a present market for at least 500 tons a day in that district, and those interviewed in Los Angeles District say it offers a market for a like amount. Mr. Hoswell, manager of the Los Angeles Foundrymen's Association, said cast-iron foundries of Los Angeles consumed now 300 tons of pig-iron a day.

Pacific Coast Steel Co., San Francisco, have six open-hearth furnaces—three of 50 tons and three of 40 tons capacity. Output is over 10,000 tons per month. Mr. Burgess, manager, said thirty to 40 per cent. more pig-iron would be used if obtainable at reasonable price and delivery.

Columbia Steel Co., San Francisco, have three open-hearth furnaces of 25 tons capacity, with normal output of merchant bar, small beams, and shapes of 6,000 tons per month; also a large cast-steel foundry with capacity of 1,500 tons per month. Heavy steel castings, such as stern and rudder frames, and heavy engine castings are supplied not only to the shipyards of San Francisco and Los Angeles, but also to those of Portland, Seattle, Tacoma, Victoria, and Vancouver. Mr. Blotchford, manager, said the plant would use 10 to 25 per cent. more pig-iron if obtainable at a reasonable price.

Judson Iron & Steel Works, San Francisco, have three open-hearth furnaces of 30 tons capacity and monthly output of 5,000 tons.

Southern California Iron & Steel Works, Los Angeles, have three open-hearth furnaces of 40 tons capacity and output of 3,000 tons per month. The plant now uses about 1,500 tons of pig-iron, 2,000 tons of cast-scrap, and 25,000 tons of scrap steel per annum. A. C. Denman, manager, said the plant would use 3,000 tons of pig-iron per month if the price was on a par with scrap-steel prices.

Llewellyn Iron Works, Los Angeles, have two open-hearth furnaces of 40 tons capacity and output of 3,000 tons per month. This plant uses per annum 6,000 tons of pig-iron, 6,000 tons of cast scrap, 33,000 tons of scrap steel, 1,500 tons of merchant bar purchased in addition to the amount produced from scrap, 5,000 tons of ship and boiler plate, and 15,000 tons of structural shapes.

Bethlehem Shipbuilding Corporation, San Francisco. took over the Union Iron Works and Risdon Engineering Works, of San Francisco. This plant is a large one and built many steel steamers during the war and handled during the same time 800 repair jobs. It has four floating docks and a large graving-dock. At present seven oil-tank steamers are under construction, each of 12,000 tons, a large steamer for private owners, and several torpedo-boats. In addition to the ship-building plant, there is a large cast-iron foundry and machine-shop. Most of the steel castings are bought outside, principally from the Columbia Steel Company. Present consumption per annum is 1,800 tons of pig-iron, 2,400 tons of billets and blooms, and 50,000 tons of structural shapes.

Baker Iron Works, Los Angeles.—This firm is principally engaged in fabricating structural steel for bridge and building purposes. It has a large machine-shop and foundry. Merchant bar is bought from local mills, but all plates, shapes, angles, channels, and beams, as well as pig-iron, comes from the Carnegie Steel Works in Pittsburgh, and delays, inconvenience, and loss in delivery occur, Eastern manufacturers getting the preference. A blast-furnace and steel-plate mill on the Coast would have the hearty support of this firm. Mr. Baker estimates the consumption in Los Angeles section, which he says represents 50 per cent. of California, per month at 1,500 tons of pig-iron, 2,000 tons of cast scrap, 6,000 tons of steel scrap, 2,000 tons of ship and boiler plates, and 1,000 tons of structural shapes; the Los Angeles Chamber of Commerce concurred in this estimate.

Foundries, San Francisco and Vicinity.—Mr. Metcalf, secretary of the Metal Trades Association, of San Francisco, said the association is composed of the majority of the cast-iron foundries of San Francisco and vicinity, comprising twenty-five foundries, working on the open-shop principal as opposed to the California Metal Trades, with closed shops, which Mr. Metcalf said was now practically dead. The twenty-five foundries employ 2,300, use 30 to 50 per cent. pig-iron, the balance scrap. Present consumption of pig-iron is from 4,500 to 5,000 tons per month.

Foundries, Los Angeles and Vicinity.—Mr. Hoswell, manager of the Los Angeles Foundry-men's Association, said foundries of Los Angeles and neighbourhood could use about 300 tons of pig-iron per day.

Table C.—Present Consumption reported by California Plants.

Plant.	Pig-iron.	Cast-iron Scrap.	Billets.	Merchant Bar.	Ship, Tank, and Boiler Plate.	Angles and Shapes.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
Llewellyn Iron Works, Los Angeles	6,000	6,000	.....	1,500	5,000	15,000
Bethlehem Shipbuilding Corporation	1,800	1,000	2,400	.....	.....	.....
Los Angeles Section, miscellaneous foundries	18,000	24,000	.....	.....	24,000	12,000
Southern California Iron Works	1,500	2,000	.....	.....	.....	.....
Miscellaneous foundries in San Francisco District	60,000	60,000	.....	.....	.....	.....
Totals	81,900	93,000	2,400	1,500	29,500	17,000

NOTE.—Southern California Iron Works would use 3,000 tons pig-iron per month if prices for same were on par with scrap-steel prices. Bethlehem Shipbuilding Corporation, ship and boiler plate and shapes, 50,000 tons.

REQUIREMENTS OF CALIFORNIA.

C. A. Day, director of Industrial Bureau, San Francisco, Chamber of Commerce, said local steel-mills consume 40,000 to 50,000 tons of raw material per month, 94 per cent. scrap, 6 per cent. pig and iron foundries using 30 to 50 per cent. pig, balance scrap, used about 4,500 to 5,000 tons of pig. Based on standard percentage and run of scrap and subject to change as increased

pig production displaced scrap, practical foundrymen submitted the following analysis for a good average grade of pig-iron which would command ready local sale:—

Silicon	3.00 to 3.25
Manganese	1.00 „ 1.25
Phosphorus, between	0.30 „ 0.80
Sulphur, under	0.05
Total carbon, not less than	3.25

Advantages of a Coast blast-furnace which would have direct bearing on sales are:—

(1.) Foundries would not have to carry extensive stocks as they now are obliged to do owing to great distance from supply.

(2.) Removal of uncertainties of transportation due to strikes, rail congestion, car shortages, etc.

(3.) Saving in transportation charges.

(4.) Assurance of steady supply adapted to special needs of local consumer.

A. G. Arnoll, manager, Industrial Department, Los Angeles Chamber of Commerce, said at present the entire Pacific Coast is dependent on the East and South for supply of pig-iron and steel, with exception of small tonnage of open-hearth steel produced from scrap at San Francisco and Los Angeles. Imports of foreign iron and steel are negligible; never likely to be of importance owing to cost of transportation. Therefore a blast-furnace and steel plant would have the whole Pacific Coast area as a market, which can only be reached by the Eastern manufacturer after paying transcontinental freight or a minimum water freight from Atlantic ports. The markets of South America are open on more than equal terms, and the great markets of Australasia, the Orient, and Siberia are available. Simply stated, pig-iron can be made on the Coast in the regular blast-furnace way at approximately two-thirds of cost of Pennsylvania pig-iron laid down in this market. Smelting of iron and manufacture of steel commercially is the most necessary of basic industries to the upbuilding of the Pacific Coast.

Mr. Arnoll said that, while it was difficult to get detailed information as to local production of ingots, billets, and merchant bars, it appears that not less than 20,000 tons of pig-iron is used per annum in this section (Los Angeles). Output of a 500-ton blast-furnace could readily be absorbed. A great tonnage of material could be secured from this section if a blast-furnace was in operation on the Coast, such as rails and other items now purchased elsewhere owing to lack of local facilities. Each month brings a greater call on local steel producers for large tonnage of high-grade machine and tool steels which have been shipped to this market in great quantities from the East. Only recently the Rich Steel Products Company, of Battle Creek, Mich., moved their large plants here, which will employ 1,500 and use large quantities of high-grade steels.

Owing to enforced use of scrap, local foundries and steel-mills have attained great efficiency in combining materials available for their operations. Steel-mills in their district consume 38,000 to 47,000 tons of scrap monthly. In war-time much difficulty prevailed in securing scrap, but the supply now fairly equals demand. Operators, however, are now limited by materials available and are discouraged from making extensions warranted by volume of local business owing to uncertainty of future increase in raw-material supply.

MARKETS FOR IRON AND STEEL.

Mr. Scott, representative of Midvale Steel Company, Pennsylvania, computes the market for steel products on the Pacific Coast, California to Alaska, at over 2,000,000 tons per annum; he had one customer good for 25,000 tons a year. There was market for 300,000 tons of light rails, 600,000 tons of plates, including marine, boiler, and tank sheet plates and structural steel; 600,000 tons of bars, including merchant bars, rounds, squares, and flats, and soft machinery or mild steel and drill-steel; and 500,000 tons miscellaneous, including nail-rods, fence-wire, etc. Heads of the Vulcan Iron Works, Seattle, consider consumption on the Pacific Coast from California to Seattle will easily aggregate 2,000,000 tons a year. S. C. E. Smith, manager of Smith-Watson Engineering Company, Portland, said he would not hazard an estimate of the aggregate consumption of all grades of iron and steel on the Coast, but admitted it must be considerably over 1,000,000 tons. A. C. Callan, broker and importer, Portland, Ore., said jobbers in Oregon handled over 20,000 tons a year of merchant bar and 1,500 to 2,000 tons of light rails. He estimated Washington jobbers to handle 30,000 to 50,000 tons of merchant bar and consider-

ably more rails. Mr. Outcoul, Industrial Commissioner, Tacoma Chamber of Commerce, said that in 1919 there were exported through Tacoma 105,301 long tons of iron and steel, all of which could be made here if a plant had been in operation. Mr. George Danz, manager, Hofius Steel Company, Tacoma, said consumption in the three Pacific States of structural steel, tank-plate, and merchant bar, including reinforcing and light rails, would run to 1,500,000 tons a year.

J. F. Thorne, business manager of *Pacific Ports*, published by Frank Waterhouse & Co., Tacoma, said consumption of iron and steel in the territory embraced by Washington, Oregon, California, Idaho, Montana, and Utah, just prior to the abnormal increase caused by the ship-building boom during the war, amounted to approximately 923,000 tons per annum. Then there were six blast-furnaces west of the Mississippi—six in Colorado, two in Montana, and one in Oregon—but only three were in operation, two in Colorado and one in Montana. Of course, since that time, due to shortage of steel in the production centres of the East and to the greatly increased local demand on account of ship-building, the conditions have changed materially and local production has greatly increased. However, the year 1915, which was at the beginning of the ship-building era on the Coast, will more nearly approximate normal conditions of the district. Because of erratic conditions existing it has been difficult to obtain accurate figures for a later period.

Analysis of consumption of iron and steel in the States under discussion in 1915, placed at 923,000 tons, shows the relative amounts approximately as follows:—

	Tons.
Pig-iron	100,000
Reinforcing-steel for concrete buildings	30,000
Sheets	136,000
Plates	217,000
Corrugated	15,000
Bar	175,000
Structural	250,000
Total	923,000

Of course, it is thoroughly understood that since the compilation of these figures the consumption has considerably more than trebled. But any figures we might aim to give during the recent high stages of the ship-building industry would be erratic and would not give a fair estimate of the normal demand. Normal consumption, as the Coast industries become straightened out, will be for domestic trade somewhere around 2,000,000 tons a year. This amount will increase as industrial progress becomes greater on the Coast.

Consumption of iron and steel on the Coast would be materially increased if there were an abundant local supply. Industries whose primary consumption is of iron and steel would be greatly increased if there were an abundant supply of iron and steel at hand: for instance, there would be a greater manufacture of bolts and nuts, perhaps of foundry material. The ship-building industry would be continued to a much greater extent and other manufacturing would become more highly developed by the mere presence of a local supply.

W. B. Henderson, of the Industrial Trade Department of Pacific Ports, Seattle, said exact and authentic information regarding markets for steel and steel products is difficult to secure. In ascertaining present consumption leading steelmen of Puget Sound were interviewed, but results obtained are not considered as complete. Consumption in Pacific States and that territory which may be considered as tributary is estimated as follows:—

	Tons.
Pig-iron	160,000
Reinforcing-steel	90,000
Sheets	100,000
Plates	125,000
Corrugated	25,000
Bar	150,000
Structural	510,000
Total	1,160,000

Considering these facts, Mr. Henderson said it is the opinion of steelmen that a blast-furnace having a capacity of 500 tons per day, together with the refining and rolling equipment necessary to manufacture the pig-iron into the various merchantable forms and shapes, would be a success. Markets are constantly expanding in the Western country and soon a much larger trade would be built up.

IMPORTS AND EXPORTS, BRITISH COLUMBIA.

The Commissioner of Customs, Ottawa, advises me that the value of iron and steel products entered for consumption in the Province of British Columbia during the fiscal year ending March 31st, 1920, amounts to \$12,352,715, but, unfortunately, he does not give the tonnage or the details of these products.

Appended are tables showing the quantities and values of the products of iron and steel imported into British Columbia during the year 1912, the nine months ending December 31st, 1917, and the six months ending September 30th, 1919.

Quantities and Values of Iron and Steel imported into British Columbia for the Fiscal Year March 31st, 1912.

Item.	Quantity.	Value.
	Tons.	
Bar iron or steel, rolled, whether in coils, bundles, rods, or bars, comprising rounds, ovals, squares, and flats, n.o.p.	6,009	\$ 203,851
Canada plates, Russia iron, terne plates and rolled sheets of iron or steel coated with zinc, spelter, or other metal, of all widths or thicknesses, n.o.p.	642	30,727
Castings, iron or steel, n.o.p. ....	.....	71,656
Iron or steel bridges or parts thereof, iron or steel structural work, columns, shapes, or sections, drilled, punched, or in any further stage of manufacture than as rolled or cast, n.o.p.	1,693	89,696
Iron in pig	7,648	102,736
Iron and steel railway bars or rails of any form, punched or not, n.o.p., for railways, which term for the purposes of this item shall include all kinds of railways, street-railways, and tramways, even although they are used for private purposes only, and even although they are not used or intended to be used in connection with the business of common carrying of goods or passengers	20,104	527,989
Rolled iron or steel angles, tees, beams, channels, girders, and other rolled shapes or sections, not punched, drilled, or further manufactured than as rolled, n.o.p.	1,640	47,938
Rolled iron or steel sheets or plates, sheaved or unsheaved, and skelp iron or steel, shared or rolled in grooves, n.o.p.	1,005	32,434
Rolled iron or steel plates, not less than 30 inches in width and not less than ¼ inch in thickness, n.o.p.	4,850	124,272
Rolled iron or steel sheets, polished or not, No. 14 gauge and thinners, n.o.p.	327	19,696
Sheets, flat, of galvanized iron or steel	385	22,094
Steel plate, universal mill or rolled edge plates of steel over 12 inches wide, imported by manufacturers of bridges or of structural work or in car-construction	9	523
Rolled iron or steel beams, channels, angles, and other rolled shapes, of iron or steel, not punched, drilled, or further manufactured than rolled, weighing not less than 35 lb. per lineal yard, not being square, flat, oval, or round shapes, and not being railway bars or rails	4,914	120,556
Boiler-plate of iron or steel, not less than 30 inches in width and not less than ¼ inch in thickness, for use exclusively in the manufacture of boilers	1,038	37,898
Iron or steel beams, sheets, plates, angles, knees, masts or parts thereof, and cable chains for wooden, iron, steel, or composite ships or vessels ..	757	27,438
Tin plates and sheets	7,653	530,199
Totals	58,674	\$1,988,701

Statement showing the Principal Items of Iron and Steel entered for Consumption through Ports in British Columbia during the Nine Months ended December 31st, 1917.

Item.	Quantity.	Value.
<i>Dutiable Goods.</i>		
Bar iron and steel, n.o.p. ....cwt.	2,694	\$ 9,013
Canada plate, Russia iron, etc. "	2,828	15,675
Castings, n.o.p. ....	.....	37,855
Cast-iron pipe ....cwt.	5,049	21,814
Chain ....	.....	39,088
Railway locomotives ....No.	11	39,609
Gas and gasolene engines "	629	146,404
Steam-engines "	22	79,466
Pipe-fittings ....	.....	119,044
Forgings ....lb.	61,548	6,624
Pig-iron ....tons	871	29,171
Iron ore "	3,385	13,542
Ore-crushers, rock-drills, etc. ....	.....	156,336
Portable saw and planing mills ....No.	69	8,137
Printing-presses ....	.....	14,844
Coal-handling machinery ....	.....	13,274
Paper- and pulp-mill machinery ....	.....	381,558
Sawmill machinery ....	.....	113,902
Machinery, n.o.p. ....	.....	945,876
Railway-spikes ....cwt.	3,736	12,871
Wire nails "	6,092	45,238
Power-pumps ....No.	237	57,972
Railway rails and bars ....tons	2,866	92,080
Rolled iron and steel angles, beams, etc. ....cwt.	21,507	85,169
Rolled iron and steel hoop, band, etc. "	3,295	27,428
Rolled iron and steel sheets "	2,182	15,545
Wire rods for the manufacture of wire "	33,496	117,089
Galvanized sheets "	5,134	41,188
Stoves ....	.....	14,196
Railway switches, frogs, and crossings ....	.....	14,955
Tubing ....	.....	91,304
Household hollow-ware ....	.....	16,613
Wire cloth ....	.....	15,237
Wire, n.o.p. ....lb.	556,830	28,826
Wire rope, twisted or stranded wire ....	.....	362,442
Scrap iron or steel ....cwt.	24,358	30,213
Universal mill-plates "	5,939	27,301
Rolled iron and steel in bars, bands, sheets, or plates, etc., over 3½c. per lb.	25,988	172,576
Tools ....	.....	80,490
Other manufacturings of iron, n.o.p. ....	.....	448,194
Total .....	.....	\$3,988,159
<i>Free Goods.</i>		
Anchors ....cwt.	1,682	\$ 10,927
Boiler-plate "	8,385	48,052
Steel and iron for ship-building "	278,950	1,294,106
Mining machinery ....	.....	116,766
Boiler-tubes ....	.....	96,705
Wire ....cwt.	2,541	11,477
Printing-presses ....No.	5	54,550
Typesetting machinery ....	.....	29,873
Ferro-manganese ....tons	9	2,120
Total .....	.....	\$1,664,576

Statement showing the Principal Items under the Classification of Iron and Steel entered for Consumption through Ports in British* Columbia during the Six Months ended September 30th, 1919.

Item.	Quantity.	Value.
Rolled iron or steel in bars, bands, hoop, scroll, strip sheet, or plate, costing over 3½c. per lb. ....cwt.	15,798	\$ 118,427
Boiler-plate, 30 inches wide and ¼ inch thick. "	12,741	51,703
Steel plate, etc., for structural work "	6,082	16,207
Tin-plate "	85,315	628,366
Rolled iron or steel sheets, 14 gauge and thinner "	6,048	26,806
Sheets, flat, of galvanized iron or steel "	4,386	25,526
Rolled iron or steel sheets or plates, unsheared or sheared, and skelp-iron, sheared or rolled grooves, n.o.p. ....cwt.	5,871	18,227
Rolled iron or steel plates, 30 inches wide and ¼ inch thick, n.o.p. "	6,072	16,912
Iron or steel beams, sheets, plates, etc., for vessels "	476,231	1,430,302
Rolled iron or steel beams, channels, etc., not further manufactured than rolled, weighing 35 lb. per lineal yard ....cwt.	13,284	36,865
Rolled iron or steel angles, tees, beams, channels, girders, etc., not further manufactured than rolled, n.o.p. ....cwt.	7,822	23,483
Railway tie plates "	7,613	15,498
Manufactured articles of iron, steel, or brass of a class not manufactured in Canada, for use in construction of ships		161,205
Seamless-steel or wrought-iron boiler-tubes		57,823
Pipe-fittings		43,060
Wire cloth or woven wire and netting		17,288
Wire rope, etc., wire cables, n.o.p.		255,651
Traction-engines for farm purposes costing \$1,400 and less .....No.	83	47,676
Cable-chains for vessels ....cwt.	5,393	51,016
Chains, n.o.p.	8	103,760
Locomotive parts		16,583
Engines, gas and gasolene, n.o.p. ....No.	473	111,803
Engines, steam "	8	59,757
Ore-crushers, rock-crushers, stamp-mills, Cornish and belted rolls, rock-drills, and percussion coal-cutters		35,648
Articles for mining and metallurgical operations		77,001
Sawmill machines		62,632
Pumps, power, and parts .....No.	231	52,265
Paper-mill machines		19,703
Machinery and parts, n.o.p.		660,016
Tools, hand, n.o.p.		45,954
Automobiles, passenger .....No.	323	365,048
Automobiles, freight "	245	459,124
Automobile parts		56,988
Motor-cycles and motor-vehicles, n.o.p. ....No.	135	14,077
Cars, other, n.o.p. "	113	118,072
Anchors ....cwt.	5,595	46,774
Nails, wire, n.o.p. "	2,493	13,532
Railway-spikes "	4,131	11,810
Nuts, rivets, and bolts, etc. "	1,734	11,770
Baths, bath-tubs, closets, and sinks, etc.		10,668
Guns, rifles, firearms		35,722
Stoves		18,738

IMPORTS TO CALIFORNIA.

Mr. Booth, manager of the Judson Iron Works, San Francisco, computes the structural and other steel for construction coming into San Francisco from the East at 3,000 tons per month. C. A. Day, director of the Industrial Bureau, San Francisco Chamber of Commerce, said the local mills roll only small structural shapes—flats, tees, angles, rounds, squares, and deformed bars for concrete reinforcement—and San Francisco depends entirely on the big steel-mills in Pittsburgh and Chicago Districts for the great tonnage of beams, columns, and plates used for structural purposes and ship-building. Requirements in 1920 for building purposes alone in the California city approximated 100,000 tons, which, if anything, was below normal.

Shipments of iron and steel to San Francisco by water were practically *nil* during the war. In 1920, to August, they totalled 11,672 tons—5,416 tons during the first six months, 2,142 tons in July, and 4,114 tons in August. Foreign shipments are principally from England and, in the pre-war period, from Germany. The best grade of pig-iron now coming from China, with freight of \$6 to \$10 per ton, added to the low cost of production owing to the small pay for labour and present moderate duty, is a keen competitor with Eastern pig-iron and likely to shut it out from the Californian market under the recently increased freight rates. Eastern rail shipments are principally from Alabama. The totals of the pig-iron shipments by rail are not now available. Rail shipments of steel to this market in 1918 totalled 636,000 tons. Later figures are not available.

EXPORTS THROUGH PACIFIC COAST PORTS.

Export markets are now large and probably will amount to a large export trade. In the past few years large quantities of iron and steel products have been sold to the Orient and the trade has been constantly expanding. We have been importing some pig-iron from China and the Orient to the Pacific Coast in competition with the Eastern manufacturers. This iron would still offer a little competition to a Western company, but could well be neglected. Average freight rate on iron and steel products from the Eastern producing centres to the Pacific Coast is \$20 per ton. This would allow Western plant a margin of, say, \$15 in extra costs to produce a ton of pig-iron. The costs to a local firm would be greater than those to Eastern companies, but after active co-operation was begun the margin would be smaller, thus leaving more money for selling costs and profit.

The exports of iron and steel through Washington Customs District during the calendar year 1919 were:—

Item.	Quantity.	Value.
Pig-iron .....tons	10,062	\$ 399,108
Scrap iron and steel "	9,348	234,602
Bar iron "	14,000	1,175,001
Wire rods "	30,000	1,893,345
All other rods of steel "	126,000	9,371,909
Billets, ingots of steel "	937	122,450
Bolts, nuts, rivets "	4,000	562,187
Car wheels and axles ..... "	.....	3,378,146
Castings ..... "	.....	220,109
Chains ..... "	.....	471,756
Boilers ..... "	.....	1,018,957
Locomotives, steam .....engines	115	3,641,497
Boiler-tubes ..... "	.....	591,762
Wire nails .....tons	14,000	1,167,724
Pipes and fittings, cast "	850	94,777
Pipes and fittings, wrought "	11,000	1,587,927
Railroad-spikes "	2,360	182,853
Steel rails "	95,708	6,478,156
Switches, frogs, etc. ....	.....	598,211
Sheets and plates, galvanized .....tons	4,170	617,029
Sheets and plates, iron "	9,360	1,105,183
Plates, steel "	152,500	12,103,316
Sheets, steel "	24,000	2,814,504
Ship and tank plates "	5,100	542,077
Structural steel and iron "	12,700	2,180,004
Wire, except barbed, steel "	18,150	1,983,619
All other manufacturings of steel and iron ..... "	.....	2,034,316

This shows a total value of iron and steel products exported through the Washington District Customs-houses of \$46,560,525. The imports of this district are negligible and may well be neglected. It will be easily seen that the port business through the Washington Customs District would be sufficient to take care of the output of a moderately sized mill on the Coast.

Referring to the export trade, Mr. Thorne, business manager of *Pacific Ports*, said total tonnage is rather difficult to obtain, as many items are listed not by weights, but rather by value, or perhaps number and value. In point of value this export trade in 1918 amounted to approximately \$100,000,000. The tonnage of pig-iron, steel billets, ingots and blooms, rails and structural iron and steel amounted in this same year to something more than 1,000,000 tons. Of the valuation given above, \$31,000,000 consisted of machinery of iron and steel and slightly more than \$68,000,000 of other iron and steel articles, including the 1,000,000 tons just described. Following is a table showing export tonnage of principal commodities of basic iron and steel articles from Pacific Coast ports during 1918:—

Pig-iron: Ferro-manganese—		Tons.
Washington		25
Pig-iron: All other—	Tons.	
Washington	12,027	
San Francisco	1,476	
	—	13,503
Steel: Billets, ingots, and blooms of steel—		
Washington	22,926	
Southern California	20	
San Francisco	7,579	
Hawaii	517	
	—	31,342
Rails—		
Washington	76,903	
Southern California	420	
San Francisco	21,232	
	—	96,555
Structural iron and steel, including shapes, I beams, etc.—		
Washington	21,104	
Southern California	4	
San Francisco	16,228	
	—	37,336
Total		180,741

PROSPECTS OF EXPORT TRADE.

At present the entire Pacific Coast is dependent on the East and South for its supply of pig-iron and steel, with exception of a small tonnage of open-hearth steel produced from scrap at San Francisco and Los Angeles. Imports of foreign iron and steel are negligible; never likely to be of importance owing to cost of transportation. Therefore, as our principal market, we have the Pacific Coast area, comprising California, Oregon, and Washington, which can only be reached by the Eastern manufacturer after paying transcontinental freight or a minimum water freight from Atlantic ports. The markets of South America are open on more than equal terms, and the great markets of Australasia, the Orient, and Siberia are available.

Regarding future prospects for development of the iron and steel commodities, at present Japan, Australia, New Zealand, Dutch East Indies, and most of the other countries on the Pacific are now importing practically all their iron and steel. There have been sporadic attempts by the Australian Government to develop an iron industry, but up to this time little progress has been made. During the next decade there will undoubtedly be a tremendous demand for railroad material, particularly iron and steel, principally in China, but also in India, the Dutch East Indies, Philippines, Australia, Borneo, and the west coast of South America. It is interesting to note in this connection that for the ten months ending April, 1920, slightly more than \$14,000,000 in steel rails were shipped to Pacific Coast countries, and that this item represented 60 per cent. of the total United States exports in this commodity. These rails were mostly of smaller and medium sizes, the percentage over 60 lb. being almost negligible.

Imports to the Pacific Coast States from the Pacific Coast countries are negligible for practical purposes. There is very little probability of serious competition for a Pacific Coast

plant from this source, for the reasons that, in the first place, the quality of the foreign production is not high, and, in the second place, that they are unable to compete on a cost basis owing to the high freight rates and cost of production at home.

With this extra business which would be open to a Coast plant, together with the local trade on the Coast, it is evident that no lack of market exists. In fact, the Eastern mills have been unable to supply the Western demands of late years and will have their entire capacity absorbed by the Eastern markets for a number of years yet. With operation of a steel-mill in this section naturally comes the establishment of subsidiary industries—foundries, tool-makers, machine-shops, large equipment and supply houses, and companies producing specialized articles, such as wire nails, pipes and tubes, etc. These likewise create a demand for more steel and cause an extension of the steel plant. Other industries depending on the use of machinery will also locate in the district.

THE TIN-PLATE INDUSTRY.

The tin-plate situation on the Pacific Coast is also interesting in this connection. Consumption of tin-plate on the Pacific Coast is well over 150,000 tons per year, but it is to the import and export phase of the subject I would refer to here. Importation of the ingots through San Francisco in 1917 was 376,085; in 1918, 537,794. In 1918 the United States imported 105,746,232 lb. of pig-tin from Asia and Oceania; 43 per cent., or 58,629,881 lb., was imported via Pacific Coast ports. Nearly all this pig-tin was shipped East at the then freight rate of 75 cents per 100 lb., and freight charges amounted to \$439,724, or 1.40 per cent. of the total value, and much of this tin was manufactured in the East and reshipped back to Pacific Coast ports for export and domestic consumption.

In 1917 exports of tin-plate to foreign ports from San Francisco totalled 328,141 cases; in 1918, 358,655 cases; and during the first eleven months of 1919 the tin-plate exported through San Francisco totalled 14,127,213 lb. This is in addition to the large amount used on the Coast for domestic purposes, such as manufacture of cans and containers.

In 1918 558,170,371 lb. of tin-plate was exported to Asia, and 29 per cent., or 162,014,832 lb., was exported via Pacific Coast ports. The freight from Eastern tin-plate mills to the Coast, at 60 cents per 100 lb., amounted to \$972,088, or 5.40 per cent. of total value of the tin-plate at the then market price. Practically 3,180 car-loads of tin and tin-plate were transported to the East for manufacturing and returned as tin-plate at expense for freight carriage of \$1,411,813. This represents the tin-plate exported and does not include the amount used for domestic consumption on the Pacific Coast, which tonnage is unquestionably as large, or larger, than the export.

There is obviously great necessity for blast-furnace and steel-mill plants on the Pacific Coast. Normal demands of the district are sufficient to maintain a large plant in continued operation and the entire metal industry would expand under its influence, and business, both domestic and foreign, which naturally belongs to the Pacific Coast, would be kept there. A blast-furnace on the Pacific Coast would also provide material from which local mills, or new mills established for that purpose, could roll the steel for manufacture of the vast tonnage of tin-plates now shipped here from the East under heavy economic loss and subject to delays and uncertainties of trans-continental shipment. It is reasonable to suppose that with an established local source of raw material capital would readily be found to build and equip the necessary plants for manufacture of tin-plate and galvanized sheets and other light material for which there is a large and growing market.

As a result of the investigations I have made in British Columbia and in the several States of the Pacific Coast, I have compiled a table showing the normal consumption of British Columbia, Washington, Oregon, and California plants, and while this does not include a complete roster of all the plants, it shows that, based on the present normal consumption, there is an ample market for at least 1,000 tons a day of pig-iron, and if it can be produced for anything like the prevailing price being paid for scrap—now ranging from \$27 to \$32 per ton—I am convinced that there would be a market for at least 2,000 tons.

The following table shows the totals as checked by me at the various iron- and steel-working plants of the Pacific Coast of present normal consumption :—

Present Consumption of Iron and Steel by Pacific Coast Iron-working Plants.

Province or State.	Pig-iron.	Scrap.	Billets.	Merchant Bar.	Ship, Tank, and Boiler Plate.	Angles and Shapes.	Rivets and Rivet-bars.	Structural Steel.
	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.	Tons.
British Columbia	3,010	7,140	163	1,825	15,270	8,715	2,500	200
Washington	91,800	14,800	12,100	950	.....	50	.....	.....
Oregon	93,000	93,500	500	1,500	10,150	500	7,000	18,000
California*	81,900	93,000	2,400	1,700	29,000	27,000	.....	.....
Totals	279,710	208,440	15,163	5,975	54,520	36,865	9,500	18,200

* In addition, ship, tank, and boiler plate and angles and shapes (combined), 50,000 tons.

This table will show that there is no doubt that the market exists for the products of iron and steel, and essentially for pig-iron.

As the basic plant for the establishment of an iron and steel industry is a blast-furnace. I have taken every care to show the extent of the local market for the output of such a plant producing the various grades of pig-iron. I am, of course, aware of the fact that the success of ship-building and kindred industries on the Coast depends on absolutely being able to procure material for their various purposes on the Coast, so as to enable them to compete with Eastern and Old Country firms. All those interviewed say there is a market on the Coast for 2,000,000 tons of iron and steel a year; that is, the aggregate consumption of all grades, including tank, ship, and boiler plate, merchant bar, tool and mining steel, structural steel, shapes and angles, and also light rails. Any plant capable of turning out all these grades and sections of steel would mean a tremendous outlay in capital for rolls and other equipment, but if blast-furnaces can be established here and a supply of the various grades of pig-iron assured at a reasonable price, subsidiary companies would undertake the manufacture of the different grades and sections of steel to suit the market. Therefore I have obtained the information as to the local market for foundry pig-iron, and that, I find, is ample to keep a plant fully occupied. The present-day consumption alone offers a market for 1,000 tons—the five plants manufacturing merchant bar from scrap in California are willing to at once undertake a contract for supply of 500 tons a day—and I feel sure that I can safely say that, without consideration of the great and growing export trade, there is a market now on the Coast for about 2,000 tons per day of foundry pig-iron.

I have, etc.,
N. THOMPSON,
Consulting Engineer.

Classification of British Columbia Industries.

MANUFACTURE OF BEVERAGES.

Firm.	Location.	Industry.
W. E. Running	Nanaimo	Manufacturing beverages.
Halcyon Bottling Works Co.	Halcyon	
Fairalls, Ltd.	Williams St., Victoria	Manufacturing aerated waters.
Thorpe & Co., Ltd.	Victoria	Manufacturing beverages.
J. Henley	New Westminster	
James Harper	Rossland	Manufacturing aerated waters.
Vancouver Botanic Beverage Co.	Vancouver	Manufacturing beverages.
Canadian Carbonate, Ltd.	Eleventh and Yew, Vancouver ...	Manufacturing liquid carbonic-acid gas.
Pioneer Bottle Works	Nanaimo	Manufacturing beverages.
Cross & Co.	38 Lansdowne Ave. E., Vancouver	Manufacturing soda-water, etc.

MANUFACTURE OF BRICK, LIME, ETC.

The Clayburn Co., Ltd.	Clayburn	Manufacturing bricks.
Rosebank Lime Co.	Victoria	Manufacturing lime.
Nicomen Sand & Gravel Co., Ltd.	c/o Foundation Co., Vancouver..	Operation of gravel-pit.
Western Canada Lime Co., Ltd.	Westminster Trust Bldg., New Westminster	Lime-kiln and quarry.
Coast Quarries, Ltd.	911 Metropolitan Bldg., Vancouver	Quarrying.
Decks Gravel & Rock Co., Ltd.	712 Pacific Bldg., Vancouver	Sand, shale, and gravel.
Fairview Sand & Gravel Co., Ltd.	1527 Main St., Vancouver	Sand and gravel bankers.
J. B. Newell	5085 Fraser Ave., Vancouver	Stone-cutting.
Vancouver Granite Co., Ltd.	815 Bower Bldg., Vancouver	Operation of Quarry.
Pacific Lime Co., Ltd.	316 Pacific Bldg., Vancouver	Lime-kiln.
Patterson, Chandler & Stephen	3149 Main St., Vancouver	Stone-cutting and marble w'ks.
Port Haney Brick Co., Ltd.	Port Haney	Manufacturing brick.
Sechelt Granite Quarry, Ltd.	Winch Bldg., Vancouver	Quarrying.
Sidney Island Brick & Tile Co.	Sidney Island	Manufacturing brick (suspended operations).
John Mortimer & Son	720 Courtenay St., Victoria	Stone-cutting.
Baker Brick & Tile Co.	Douglas and Tolmie Sts., Victoria	Manufacturing brick.
Phillips Stone Works	1502 Fairfield Rd., Victoria	Stone-cutting.
Producers Rock & Gravel Co., Ltd.	Store St., Victoria	Sand and gravel pits.
Stewart Monumental Works	Victoria	Stone-cutting.
Granite Quarries, Ltd.	315 Bower Bldg., Vancouver	Quarrying.
Victoria Brick Co., Ltd.	Douglas St., Victoria	Manufacturing brick.
Canadian Marble & Granite Works, Ltd.	Nelson	Quarrying and stone-dressing.
Gabriola Shale Products, Ltd.	Moody Block, Victoria	Manufacturing brick.
Humber Brick Co.	207 Pemberton Bldg., Victoria ..	Brickyard.
Stewart & Willey	5332 Fraser Ave., Vancouver	Monumental works.
J. A. & C. H. McDonald	1571 Main St., Vancouver	Stone-cutting.
C. H. Colgrove	Prince George	Sand and gravel.
Ceramic Industries, Ltd.	304 London Bldg., Vancouver ..	Manufacturing brick.
North-west Lime Co., Ltd.	514 Savward Bldg., Victoria	Lime-quarry.
Art Monument Co., Ltd.	602 Fifteenth Ave. E., Vancouver	Stone-cutting.
Warren, Doran & Mowatt	1345 Lyall St., Esquimalt	Quarrying (suspended operations).
Henson & Dyson	Victoria	Concrete blocks.
Terrace Brick Co.	Terrace	Manufacturing brick.
The Polychrome Cement, Brick & Tile Co., Ltd.	Granville Island, Vancouver	"
Lakeside Clay Products, Ltd.	Vernon	"
The Land Limes, Ltd.	Armstrong	Ground limestone for fertilizer.
Vernon Granite & Marble Co., Ltd.	Vernon	Stone dressing or cutting.
Enderby Brick Co.,	Enderby	Brick-making.

MANUFACTURE OF BROOMS AND BROOM-HANDLES.

Crown Broom Works, Ltd.	Vancouver	Manufacturing brooms.
Western Broom Works	"	
B.C. Wood Turners, Ltd.	"	Manufacturing broom-handles.
Vancouver Handle Co., Ltd.	"	
B.C. Brush Works, Ltd.	"	Manufacturing brooms and brushes.
B.C. Handle Co., Ltd.	"	Manufacturing broom-handles.
Giffen & Begg	"	"

CANNERIES.		
Firm.	Location.	Industry.
Babington & Simpson	Prince Rupert	Canning crabs.
Clayoquot Sound Canning Co., Ltd. ...	Victoria	Cannery.
Sooke Harbour Fishing & Packing Co., Ltd.	"	"
Nanaimo Cannery & Packers, Ltd.	Nanaimo	Cannery and fishing.
Glenrose Canning Co., Ltd.	New Westminster	Canning and fishing.
St. Mungo Canning Co., Ltd.	"	"
Great West Packing Co., Ltd.	Steveston	Cannery and fishing.
Anglo B.C. Packing Co., Ltd.	Vancouver	"
B.C. Fishing & Packing Co., Ltd.	"	"
Defiance Packing Co., Ltd.	"	Canning fish (suspended operations).
Cassiar Packing Co., Ltd.	"	Cannery and fishing.
M. DesBrisay Co.	"	"
Giffin Canneries, Ltd.	"	Cannery.
Gosse-Millerd Packing Co., Ltd.	"	Cannery and fishing.
Gulf Island Fishing & Canning Co., Ltd.	"	Canning fish.
C. L. Packing Co., Ltd.	"	"
Kildala Packing Co., Ltd.	"	"
Preston Packing Co., Ltd.	"	Cannery.
Wallace Fisheries, Ltd.	"	Cannery and fishing.
Nootka Packing Co., Ltd.	Nootka	Cannery.
Western Salmon Packing Co., Ltd.	c/o Evans, Coleman & Evans, Vancouver	Cannery and fishing.
Canadian Fish & Cold Storage Co., Ltd.	Prince Rupert	Cannery.
Quathiaski Canning Co., Ltd.	Quathiaski Cove	Cannery and fishing.
The Provincial Cannery Co., Ltd.	Fort and Wharf Sts., Victoria ..	Cannery.
Western Packers, Ltd.	Vancouver	Cannery and fishing.
Sidney Trading Co., Ltd.	Sidney	Cannery.
Liverpool Canning Co., Ltd.	Vancouver	"
Lockeport Canning Co., Ltd.	"	"
Sidney Canning Co., Ltd.	Sidney	"
J. H. Todd & Sons	Victoria	Cannery and fishing.
Lummi Bay Packing Co., Ltd.	Birmingham, Wash. (Two canneries on Vancouver Island).	"
Maritime Fisheries, Ltd.	Vancouver	"
Star Cannery, Ltd.	"	Cannery and fishing (suspended operations).
Sugarman & Greenberg	Foot of Alberta St., Vancouver..	Cannery.
McTavish Fisheries, Ltd.	Vancouver	Cannery and fishing.
H. M. Frazer	Gore Wharf, Vancouver	Canning crabs.
Bamfield Fisheries, Ltd.	Bamfield	Cannery.
Ocean Packing Co., Ltd.	304 Credit Foncier Bldg., Vancouver	Cannery and fishing (suspended operations).

CHEMICALS AND EXPLOSIVES.

Nichols Chemical Co., Ltd.	Barnet	Manufacturing chemicals.
Giant Powder Co. of Canada, Ltd.	Nanoose Bay	Manufacturing explosives.
Canadian Explosives, Ltd.	913 Birks Bldg., Vancouver	Manufacturing explosives.
Victoria Chemical Co., Ltd.	Victoria	Manufacturing chemicals (suspended operations).
Sabulite Explosives, Ltd.	1001 Rogers Bldg., Vancouver ...	Manufacturing explosives.
Electro Products	c/o Marine Iron Works, Victoria..	Manufacturing chemical compounds.

MANUFACTURE OF CIGARS.

Pioneer Cigar Factory	1129 Haro St., Vancouver	Manufacturing cigars.
P. & R. Cigar Factory	1022 Seymour St., Vancouver ...	"
Province Cigar Co.	Victoria	"
Stettler Cigar Factory, Ltd.	Vancouver	"
F. E. Davidson	Kamloops	"
Phillip Gable Co.	Nanaimo	"
J. C. Thelin	Nelson	Manufacturing cigars (suspended operations).
B.C. Cigar Factory	New Westminster	Manufacturing cigars.
Beaver Cigar Factory	"	"
Solo Special Cigar Factory	"	"
Terminus Cigar Factory	378 Fifteenth Ave. E., Vancouver	"

MANUFACTURE OF CLOTHING, KNITTING-MILLS, ETC.

Guarantee Wholesalers	806 Granville St., Vancouver	Manufacturing clothing.
Turner, Beeton & Co., Ltd.	Victoria	"
G. A. Campbell	500 Beatty St., Vancouver	"
Victoria Hat Factory	Victoria	Manufacturing hats.

MANUFACTURE OF CLOTHING, KNITTING-MILLS, ETC.—Continued.

Firm.	Location.	Industry.
Gault Bros., Ltd.	261 Water St., Vancouver	Manufacturing clothing.
Vanity Waist & Neckwear Co., Ltd.	136 Water St., Vancouver	
Paris Hat & Frame Co.	305-17 Cordova St. W., Vancouver	Manufacturing ladies' & men's hats.
Dal Real Lace Co., Ltd.	Vancouver	Manufacturing clothing, silk, and lace.
Kerr Manufacturing Co.		Manufacturing neckwear.
Maple Leaf Knitting Co.	135 Hastings St. W., Vancouver..	Manufacturing knitted goods.
H. L. Finlayson	Vancouver	Manufacturing ladies' waists.
Cravat and Regalia Company, Ltd.	436 Howe St., Vancouver	Manufacturing neckwear.
Comfort Blouse Manufacturing Co.	367 Granville St., Vancouver	Manufacturing ladies' waists.
Hamilton-Carhartt Cotton Mills, Ltd.	500 Beatty St., Vancouver	Manufacturing clothing.
Pride of the West Knitting Mills, Ltd.	Vancouver	Manufacturing knitted goods.
Vancouver Knitting Co., Ltd.	"	Manufacturing clothing.
Universal Knitting Co., Ltd.	"	Manufacturing knitted goods.

COAL-MINING.

Telkwa Collieries, Ltd.	Telkwa	Coal-mining (suspended operations).
Coalmont Collieries, Ltd.	Coalmont	Coal-mining.
Corbin Coal & Coke Co.	Corbin	"
Crow's Nest Pass Coal Co., Ltd.	Fernie	"
Middlesboro Collieries, Ltd.	Middlesboro	Coal-mining (suspended operations).
Canadian Western Fuel Co.	Nanaimo	Coal-mining.
Vancouver-Nanaimo Coal Mining Co., Ltd.	"	"
Nanoose-Wellington Coal Co., Ltd.	Wellington	"
Princeton Coal & Land Co., Ltd.	Princeton	"
Canadian Collieries (Dunsmuir), Ltd.	Victoria	"
Pacific Coast Coal Mines, Ltd.	"	"
Fleming Coal Co., Ltd.	Merritt	"
Chn Chua Coal Mines Co.	Kamloops	"
Harvard Coal Co., Ltd.	Princeton	"
A. G. King & E. R. Foster	Nanaimo	"
The East Wellington Coal Co.	"	"
Granby Consolidated Mining & Smelting Co., Ltd.	Cassidy	"
Merritt Collieries	Merritt	Coal-mining (suspended operations).

MANUFACTURE OF CONFECTIONERY.

John P. Matthews Candy Co.	1308 Wharf St., Victoria	Manufacturing confectionery.
Mainland Confectionery Co.	1280 Homer St., Vancouver	Manufacturing candy.
H. A. Lilley	Victoria	Manufacturing confectionery.
Ormonds, Ltd.	"	Manufacturing confectionery and biscuits.
H. S. Stevenson	"	Manufacturing confectionery.
Bullen Bros.	1974 First Ave. W., Vancouver ..	"
Kelly Confection Co., Ltd.	1106 Mainland St., Vancouver ..	"
Wiper & Co.	Victoria	"
R. C. Purdy	Vancouver	Manufacturing candy."
Hamsterley Farm Products	Victoria	"
Howards, Ltd.	1927 Second Ave. W., Vancouver..	"
Royal Candy Co.	Victoria	"
Phillips Confectionery Shop	1426 Government St., Victoria ..	"
F. S. Clark	Nanaimo	"
Ramsay Bros. & Co., Ltd.	990 Powell St., Vancouver	Manufacturing candy and biscuits.
J. P. Matthews Candy Co.	Vancouver	Manufacturing candy.
National Biscuit & Confection	"	Manufacturing biscuits.

COOPERAGES.

Joseph R. Robertson	Vancouver	Cooperage (suspended operations).
Sweeney Cooperage Co., Ltd.	Victoria	Manufacturing staves and heads.
B.C. Stave & Heading Co., Ltd.	Vancouver	Manufacturing staves.
British Columbia Barrel Co.	"	Manufacturing barrels (suspended operations).
L. J. Champion	South Vancouver	Cooperage.
Fraser River Cooperage	Foot of Fraser Ave., South Vancouver	Cooperage and manufacturing heads.

FLOUR AND RICE MILLING, ETC.

Firm.	Location.	Industry.
Easterbook Milling Co., Ltd.	Eburne	Flour and grain milling.
Gim Fook Yuen, Ltd.	Victoria	Rice-milling.
Mount Royal Milling and Manufacturing Co., Ltd.	"	"
Marten & Robertson, Ltd.	329 Railway St., Vancouver	"
Wing Sang Yuen Rice Mill Co.	Victoria	"
Brackman-Ker Milling Co.	"	Flour-milling.
Asahi Rice Mills	821 Powell St., Vancouver	Rice-milling.
Vancouver Milling & Grain Co., Ltd. ..	Vancouver	Flour-milling.
Soda Creek Flour Mills	Soda Creek	"

FRUIT CANNING AND EVAPORATING PLANTS, ETC.

Mrs. Geo. Pound	619 Fifteenth St. E., Vancouver..	Manufacturing jams and jellies.
Chilliwack Evaporating & Packing Co., Ltd.	Chilliwack	Evaporation of vegetables(suspended operations).
Okanagan Canning Co., Ltd.	Rutland	Fruit-canning.
William Robinson	3636 Fourth Ave. W., Vancouver	Manufacturing food products.
W. B. M. Calder, Orchard City Evaporator	Kelowna	Evaporating plant.
Dominion Cannerys, Ltd.	332 Drake Street, Vancouver	Manufacturing food products.
Mrs. Haines, Ltd.	2645 Fourth Ave. W., Vancouver	Manufacturing jams and jellies.
B.C. Hop Co., Ltd.	Sardis	Evaporating vegetables.
Victoria Pressing & Canning Co.	648 Cormorant St., Victoria	Canning and packing fruit.
H. J. & J. A. Wattie	1749 Keefer St., Vancouver	Manufacturing marmalade.
B.C. Hop Co., Ltd.	Agassiz	Evaporator (suspended operations).
Keremeos Packing Co., Ltd.	815 Bower Bldg., Vancouver	Fruit-canning.
Alice Stanley	Alta Vista	Manufacturing jam.
White Manufacturing Co.	149 Alexander St., Vancouver ...	Manufacturing food products.
Hamsterley Farm Jam Co., Ltd.	Victoria	Manufacturing jam.
O.U.G. Fruit Products, Ltd.	Vernon	Cannery and evaporator.
North Kamloops Fruit Growing & Canning Association	Kamloops	Fruit-canning.
MacDonald Jam Co.	Nelson	Manufacturing jam.
Empress Manufacturing Co., Ltd.	Vancouver	Manufacturing jams, jellies, and spices.
W. A. Jameson Coffee Co.	Victoria	Manufacturing coffee and spices.
Western Pickling Works, Ltd.	"	Manufacturing pickles.
Harvey Coffee & Spice Mills, Ltd.	"	Manufacturing coffee and spices.
Vancouver Pickle Co., Ltd.	Vancouver	Manufacturing pickles.
Broder Canning Co., Ltd.	New Westminster	Fruit-canning.

MANUFACTURE OF FURNITURE.

Hardwood Chair Co.	Vancouver	Furniture.
The Restmore Manufacturing Co.	Victoria	"
Province Furniture Manufacturing Co., Ltd.	Vancouver	"
Western Toy & Furniture Manufacturing Co., Ltd.	"	"
Dowling Manufacturing Co.	"	"
D. C. Timewell	"	"
W. E. Hammond	"	"
Connaught Furniture Manufacturing Co.	"	"
Green Lumber & Furniture Co., Ltd.	Victoria	Furniture (suspended operations).
Dominion Composition Furniture & Toy Manufacturing Co., Ltd.	"	Furniture.
Steel & Dodd	New Westminster	"
K. Aalten	Vancouver	Bamboo furniture.
Thomas Bennett & Sons.	"	Furniture.

MANUFACTURE OF ICE-CREAM.

Almonds, Ltd.	400 Pender St. E., Vancouver ...	Ice-cream.
City Dairy Co.	New Westminster	"
F. S. Clarke	Nanaimo	"
Comox Creamery Association	Courtenay	"
Curlew Creamery Co.	Grand Forks	"
"	Nelson	"
Fraser Valley Dairy	1170 Hornby St., Vancouver	"
Kelowna Creamery Co., Ltd.	Kelowna	"

MANUFACTURE OF ICE-CREAM—Continued.

Firm.	Location.	Industry.
J. E. McKenzie	Nanaimo	Ice-cream.
Westminster Ice & Creamery Co.	New Westminster	"
Northern Okanagan Creamery Association	Armstrong	"
Royal Dairy	Victoria	"
David Spencer, Ltd.	1001 Pender St., Vancouver	"
W. S. Terry	Vancouver	"
Victoria City Dairy Co., Ltd.	Fort St., Victoria	"
White Lunch, Ltd.	1111 Fort Street, Victoria	"
Crescent Ice Cream Co.	123 Hastings St. W., Vancouver..	"
Northwestern Creamery, Ltd.	1002 Hastings St. W., Vancouver	"
	Victoria	"

LOGGING.

D. McConvey	North Gabriola Island	Logging.
H. A. Corns	Thurlow P.O.	"
Slocan Valley Lumber Co.	Koch's Siding	"
H. Imada	205 Powell St., Vancouver	"
McDonald Murphy Co.	606 Vancouver Block, Vancouver..	"
Capilano Timber Co., Ltd.	North Vancouver	"
Nimkish Timber Co.	1527 Standard Bank, Vancouver..	"
Ira A. Reid	New Westminster	Logging (suspended operations).
S. McKee	Langley Prairie	Logging.
Little Bros.	Texada Island	"
Geo. Lake	Fernie	Logging (suspended operations).
Edwin Sands	c/o R. V. Winch, Vancouver	Logging.
Vaunstone Logging Co.	c/o B.C. Manufacturers' Association, New Westminster	"
J. Anger	Maillardville	Logging (suspended operations).
Ralph Simpson	Arrowhead	Logging.
Vedder River Shingle Co., Ltd.	412 Yorkshire Bldg., Vancouver..	Logging (suspended operations).
Hardy & Barber	Rutland Road, North Kelowna ..	"
J. S. Williver	Arrow Park	"
Louis Schulz	Atlin	Logging.
Diekey & Herd	Thurston Harbour, Q.C.L.	Logging (suspended operations).
Adolph Lumber Co.	Baquis Lake	Logging.
J. M. Watkins	498 Fifth Ave., Vancouver	"
Floyd Bros.	Greenwood	Cutting ties (suspended operations).
Benton Lumber & Pole Co.	Benton Siding	Logging.
S. C. Mitchell Co.	Brideville	"
M. Dumond	"	"
Russell Logging Co.	829 Standard Bank, Vancouver..	"
Dahl & Falk, Ltd.	203 Carrall St., Vancouver	"
J. W. Milligan	Sayward Bldg., Victoria	"
Y. Yakatsui	126 Cordova St. E., Vancouver ..	"
Wm. Graham	Maekensen P.O.	Logging (suspended operations).
G. O. Guise & Weed	Midway	Logging.
J. A. Birtois	Caseade	"
Judd Moore	Frederick Arm	"
Adams River Lumber Co., Ltd.	Chase	"
Victoria Lumber & Manufacturing Co., Ltd.	Vancouver	"
R. H. Williams Cedar Co.	Chemainus	Cutting poles.
Dempsey, Ltd.	610 Pacific Bldg., Vancouver	Logging.
Orion Bowman	Sardis	"
Eugene Patterson	Popcum	"
G.L. Logging Co., Ltd.	1211 Dominion Bldg., Vancouver..	"
Nitinat Logging Co.	1003 Langley St., Victoria	"
John K. Urquhart	Courtenay	"
Beaver Creek Lumber Co.	Jervis Inlet	Logging (suspended operations).
Eastern Lumber Co.	Ladysmith	Logging.
Gordon Development Co.	606 Vancouver Block, Vancouver.	"
J. Manson	Cortes Island	"
Hoard & Flaherty Logging Co.	Bainbridge	"
Eagle Timber Co.	707 Northwest Bldg., Vancouver..	"
Cranbrook Sash & Door Co.	Cranbrook	"
Red Mountain Lumber Co.	Penny	"
F. S. Uyohara	Bishop's Landing	"
Port Moody Lumber Co.	Strawberry Hill P.O.	"
J. T. Knapps	Langley Prairie	Logging (suspended operations).
Andrew Piercy	Courtenay	"
Joseph Rush	Gibson's Landing	Logging.
Graham & McFarland	Denman Island	Logging (suspended operations).

LOGGING—Continued.

Firm.	Location.	Industry.
J. E. Bateman	Giscome	Logging.
Mc & Mc Logging Co.	612 Dominion Bldg., Vancouver.	"
Upper Fraser Lumber Co., Ltd.	Dome Creek	"
Hillcrest Lumber Co., Ltd.	Duncan	"
Royston Lumber Co.	Cumberland	"
Salmon Valley Lumber & Pole Co.	Koch's Siding	Logging.
James H. Hearn	Salmo	"
John S. Shea	Coghlan	Logging (suspended operations).
Frank Beban	Extension	Logging.
Rex Barker	Shoal Bay	Logging (suspended operations).
Fred Churchill	Porto Rico P.O.	Logging.
I. Andre	Fernie	"
A. Farquharson	"	"
J. S. Mangan	"	"
T. Bossie	"	"
R. Fujii	442 Hastings St. E., Vancouver.	Logging (suspended operations).
Rock Creek Lumber Co.	Flagstone	"
Joseph Morton	Seechelt Inlet	"
J. H. Hayes	Fort Steele	Logging.
J. W. Vipond	Nanaimo	"
G. Maeda	126 Cordova St. E., Vancouver.	Logging (suspended operations).
Dr. J. F. Grant	Victoria	Logging.
H. M. Okihiro	134 Powell St., Vancouver	Logging (suspended operations).
J. Carib	Midway	"
Virginia Lumber Co., Ltd.	Coombes	Logging.
Dome Mountain Lumber Co., Ltd.	Dome Creek	"
C. E. Severus	Slocan City	"
Evans Creek Sawmill	Evans Creek	"
Jewell Sawmill Co., Ltd.	Carthness	"
Elk Lumber Co., Ltd.	Fernie	"
Harry Sawyer	Revelstoke	"
J. C. Wilson Lumber Co.	Qualicum Beach	"
The Bendickson Logging Co.	1214 Standard Bank, Vancouver.	"
D. A. McNaughton	Jervis Inlet	"
Inland Timber Co.	912 Dominion Bldg., Vancouver.	"
Swift Creek Lumber Co.	Swift Creek	"
James H. Parkin	Wattsburg	"
Gus Olson	Britannia Beach	"
K. Dowasaka	Dominion Bldg., Vancouver	"
T. Aoki	323 Hastings St. E., Vancouver.	"
Copper Creek Lumber Co., Ltd.	Cranbrook	"
Kootenay Lakes Cedar Co.	Nelson	"
C. L. Stonehouse	134 Nineteenth St. E., North Vancouver	"
Mitchell & Hallett	Kitimat	"
Richard Fiddlek	Cedar P.O., via Nanaimo.	"
Jardine & Skelhour	Sechart	Logging (suspended operations temporarily).
J. A. Westwood	1134 Twenty-fourth Ave. E., Vancouver	Logging.
Hanna & Patchell	Harrison Hot Springs	"
T. C. Ross	Ladysmith	"
J. M. Humphrey	Malakwa	Logging (suspended operations temporarily).
Chas. Peters	New Westminster	Logging.
T. Sasaki	336 Pender St. W., Vancouver	Logging (suspended operations temporarily).
W. C. Palmer	Lund	Ditto.
I. D. Clarkson	Fife	Logging.
Lynn Valley Lumber Co.	Lynn Creek, North Vancouver	"
Mathias Hemlingsen	Cowichan Lake	"
A. L. Patchett	Merritt	"
W. Phillips & Sons	Sooke	"
J. H. Jordan	Cranbrook	Logging (suspended operations temporarily).
Orford Bay Timber & Logging Co., Ltd.	Lund	Ditto.
Frank Chartrand	Rock Creek	Logging.
O'Hara & Bjorkman	"	"
Bloedel Stewart & Welch	Standard Bank Bldg., Vancouver	"
James Easthorn	North Gabriola	"
New Ladysmith Lumber Co., Ltd.	Nanaimo	"
H. T. Wright	"	"
Laviolette & McIntyre	Simoon Sound	"
Edgewood Lumber Co.	Castlegar	"
Lindsley Bros., Ltd.	Nelson	"
Lakeview Logging	Pltt Lake	"
McGougan & McDonald	510 Northwest Bldg., Vancouver	"
Laminated Materials Co., Ltd.	New Westminster	"
Pacific Logging Co., Ltd.	924 Vancouver Block, Vancouver	Logging (suspended operations temporarily).
Apex Lumber	810 Dominion Bldg., Vancouver	Ditto.
Michael G. Danaher	Danaher	"

LOGGING—Continued.

Firm.	Location.	Industry.
Booth Logging	1205 Dominion Bldg., Vancouver	Logging.
W. F. Gibson	1222 Keefer St., Vancouver	Logging (suspended operations temporarily).
Ted Anderson	Cascade	Cutting poles.
Domingo Silrey	Ladysmith	Logging (suspended operations temporarily).
H. Hanson	Agmont	Logging.
Tahkina Timber Co., Ltd.	336 Pender St. W., Vancouver..	"
Whitman Logging Co.	631 Eleventh Ave. E., Vancouver	"
International Timber Co., Ltd.	Rogers Bldg., Vancouver	Logging.
Lamb Lumber Co.	608 Bank of Nova Scotia, Vancouver.	Logging (suspended operations temporarily).
Carter & Roberts	Elko	Logging.
Northern Cedar Logging Co., Ltd.	1016 Rogers Bldg., Vancouver...	Logging (suspended operations temporarily).
K. Taniguchi	829 Standard Bldg., Vancouver..	Logging.
M. A. Barnes	Merritt	Logging (suspended operations temporarily).
W. S. Prescott	1462 Eleventh Ave W., Vancouver	Logging.
J. S. McGregor	Duncan	"
T. Tracy	Camagna	"
Comox Logging & Railway Co.	Comox	"
Powell River Co., Ltd.	Powell River	"
Mainland Cedar Co., Ltd.	Connaught Bridge, Vancouver ...	"
Wolf & Way	Ruskin	Logging (suspended operations temporarily).
D. Bailey	Capilano P.O.	Logging.
Pacific Mills, Ltd.	Ocean Falls	"
Vogel & Gordon	Otter Point	"
Nanoose Lumber Co., Ltd.	Parksville	"
P. B. Anderson	325 Pacific Bldg., Vancouver ...	"
Altamont Lumber Co.	DeMuth, Kettle Valley Rly.	"
Pacific Shingle Co., Ltd.	Coquitlam	"
Abernethy & Loughheed	Harvey	"
George H. Sumner	c/o Vancouver Lumber Co., Vancouver.	Logging (suspended operations temporarily).
A. Lambert	Powell River	Logging.
James A. Brown	Port Essington	"
J. R. Morgan & Co., Ltd.	Prince Rupert	"
H. L. McLean	Chase	"
Frank M. Barnes	Merritt	"
A. E. Burnett	906 Dominion Bldg., Vancouver..	"
Sam S. Orser	Nelson	"
L. H. Roberts	Roberts Creek	Logging (suspended operations temporarily).
R. Berrie	Rossland	Logging.
J. S. Deschamps	"	"
Jno. Vigene & Sons	Arrowhead	"
S. Miyasaki	Salmon	"
Brayden & Johnston	Salmon Arm	"
Robert Croll	Revelstoke	"
Jno. Nixon	Chase	"
F. A. J. Copley	Shawnigan	"
T. J. Vanstone	New Denver	"
R. Tooshaw	Phoenix	Logging (suspended operations temporarily).
Oscar Salstrom	Nakusp	Logging.
I. Noda	208 Hastings St. E., Vancouver..	"
Tack Logging Co.	811 Rogers Bldg., Vancouver ...	"
S. J. Demaresq	c/o Mun-Kerr Logging Co., Ltd., Vancouver Block	"
Iver & Ed. Peterson	Canoe	"
Dempsey, Ltd.	610 Pacific Bldg., Vancouver	"
Conrad Wigen	Wynndel	Logging and box-manufacturing.
The Baker Lumber Co., Ltd.	Waldo	Logging.
Wattsburg Lumber Co., Ltd.	Wattsburg	"
"	South Slocan	"
Otis-Staples Co., Ltd.	Wycliffe	"
The Lovering Lumber Co., Ltd.	Wasa	"
Crow's Nest Pass Lumber Co., Ltd.	Wardner	"
Mrs. F. J. Hawkins	3008 Douglas St., Victoria	"
George Fennell	Chu Chua	Logging (suspended operations temporarily).
National Timber Co., Ltd.	905 Credit Foncier Bldg., Vancouver	Logging.
Merrill & Ring Lumber Co., Ltd.	Duncan Bay	"
A. Peterson	Smithers	Logging (suspended operations temporarily).
Benjamin Morgan	Nanaimo	Logging.
W. H. Day Lumber Co., Ltd.	512 Standard Bldg., Vancouver..	"
McNeil & Jennings	Smithers	"
Undine Logging Co., Ltd.	512 Standard Bldgs., Vancouver..	"
McLean & Paterson	Powell River	Logging (suspended operations temporarily).
Davis Logging & Trading Co., Ltd.	Standard Bank Bldg., Vancouver..	Logging.

LOGGING—Continued.

Firm.	Location.	Industry.
Chelsea C. Cornish	Nanaimo	Logging.
Kennedy & Co.	808 Third St. E., North Vancouver	"
Brooks-Scanlon-O'Brien Co., Ltd.	1222 Standard Bldg., Vancouver..	"
Pidcock Bros.	Quathiaski Cove	"
James Mulroney	Green Points Rapids	Logging (suspended operations temporarily).
D. & S. Vaughan	Lund	Logging.
Russell M. Evans	Beaton	Logging (suspended operations temporarily).
Northern Pacific Logging Co., Ltd.	606 Vancouver Block, Vancouver	Logging.
The James Logging Co., Ltd.	514 Bank of Nova Scotia Bldg., Vancouver	"
H. Newcomen	Lardeau	"
Asken & Garson	North Vancouver	"
Pacific Lumber & Trading Co., Ltd.	Pacific Bldg., Vancouver	"
Ushizima & Komatsu	Clowholm Falls	"
W. Bradburn & Son	Powell River	Logging (suspended operations temporarily).
Victor Beug	Hardwick Island	Logging.
Chas. Sahlstrom	Kincaird	"
O'Connor Logging Co., Ltd.	707 Northwest Bldg., Vancouver..	"
Akbar Logging Co.	Mayo Siding, Duncan	Logging (suspended operations temporarily).
A. C. Vickery	Langford	Logging.
A. A. Faulkner	Enderby	"
J. H. Newton	Chase	Logging (suspended operations temporarily).
Harrison Lake Logging Co., Ltd.	Harrison Mills	Ditto.
Garlin & Co.	Alberni	Logging.
Lee Sing	Shawnigan	"
N. K. Wade	Port Kell	"
Oswald L. Bouhilier	Arrowhead	"
W. T. Dougan	Cobble Hill	"
A. A. Plummer Co., Ltd.	810 Dominion Bldg., Vancouver..	"
James Parslow	2264 Fifteenth Ave W., Vancouver	"
R. W. Brahm	Sicamous	"
The A. McDonald Co.	Galloway	"
Rainbow Creek Lumber Co.	Flagstone	"
Salmon River Saw Mills, Ltd.	Prince George	"
Sam Wilkinson	Elko	"
John C. Eaton	North Gabriola Island	"
The Hanson Logging Co.	Dominion Bldg., Vancouver	"
Hollings Bros.	Cobble Hill	"
Nakata Kingora	433 Alexander St., Vancouver	"
Manzer Bros. & Bain	Silverdale	"
Aeroplane Spruce Co., Ltd.	Port Clements	"
D. A. McLeod	Chase	"
Kayuichi Naito	227 Main St., Vancouver	Logging (suspended operations temporarily).
Wada & Kamnishi Logging Co.	Vancouver	Logging.
Leip & Wilt	Alvin	Logging (suspended operations temporarily).
L. A. Johnson	McBride	Logging.
Valley Cedar Co.	Dunster	"
Hargreaver Bros.	Tete Jaune Cache	"
G. A. Hall	Dunster	"
T. A. Wilson	"	Logging (suspended operations temporarily).
Joseph Lepore	772 Georgia St. E., Vancouver...	Logging.
C. H. B. Reeves	Roberts Creek	Logging (suspended operations temporarily).
Sungar Johnson	Smithers	Logging.
E. L. Steeves	West Bridge	"
Jonathan Reed	Malakwa	"
Seaside Lumber Co., Ltd.	Hillside, Howe Sound	Logging (suspended operations temporarily).
Carthels & Sorenson	1221 Douglas St., Victoria	Logging.
Hind & Paddon	c/o W. W. Hind, Imperial Block, Vancouver	"
J. P. Dirassar	Wilson Creek	"
Eric Cuvetin	Merritt	"
H. L. Birmingham	Blind Channel	Logging (suspended operations temporarily).
T. A. Mandt	Alvin	Logging.
James R. Motion	Alberni	"
Oscar Olson	Nakusp	"
Pine Grove Logging Co., Ltd.	Abbotsford	Logging (suspended operations temporarily).
Crane & McKean	Daisy Lake P.O.	Logging.
F. J. Bossley	Enderby	"
Pollock & Ross Logging Co.	Seechelt	"
W. E. DeMille	Blind Channel	"
H. Whittaker	Seechelt	"
R. H. Brett	Chase	Logging (suspended operations temporarily).
A. N. Barbour	Powell River	Logging.

LOGGING—Continued.

Firm.	Location.	Industry.
R. Fawcett & R. Burns	Arrowhead	Logging.
Phillip McBryen	Chase	Logging (suspended operations temporarily).
Sayward Logging Co.	Marpole	Logging.
R. S. Burden	Coquitlam	"
L. Setterlund	Fife	Logging (suspended operations temporarily).
F. Timberland	"	Logging.
Holland & Edwards	Squamish	Logging (suspended operations temporarily).
Edward Elder	Bitt Lake	Logging.
F. J. Downing	Britannia Beach	Logging (suspended operations temporarily).
A. L. Snow	706 Twelfth Ave. E., Vancouver.	Logging.
Yeatman Bros.	Quathiaski Cove	"
Taira Ikeda	75 Cordova St. W., Vancouver.	"
E. O. Perrett	Mileno Cove, Homfray Channel.	"
Burrett Lumber Co.	Swift Creek	"
Durant H. Trigena	Gibson's Landing	"
Deep Cove Logging Co.	525 Pacific Bldg., Vancouver	"
W. J. Gugin	Seechelt	"
A. A. McCormick	Surge Narrows	"
Chas. Eng	408 Pacific Bldg., Vancouver	"
Robert Munson	Kelowna	"
Albert Edgar Burnett	Rogers Bldg., Vancouver	"
Messrs. Roe & Milne	Marblehead, Lardeau	"
Otto Johnson	Malakwa	"
F. D. Treat	Sicamous	"
J. G. Gilbert	Edgewater	Logging (suspended operations temporarily).
H. Trussler	Arrowhead	Logging.
Chas. Roberts	Edgewater	"
J. E. Johnson	New Westminster	"
C. H. Lane	East Bella Bella	"
Timberland Development Co.	Ladysmith	"
I. C. Raby	Lardeau	Logging (suspended operations temporarily).
John Harper	Silverdale	Logging.
Peachland Lumber & Manufacturing Co.	Peachland	Logging.
Swanstrom & Polson	Sicamous	Logging (suspended operations temporarily).
W. H. Johnson	Whonnock	Ditto.
Brandon & Dancy	Lardeau	Logging.
Thomas Picard	Nakusp	"
W. H. Crawford	Swanson Bay	"
R. H. and Son	Stillwater	"
B. F. Somerville	Malakwa	"
August Erickson	"	"
Hector MacDonald	Seechelt	Logging (suspended operations temporarily).
Clovette & Gardiner	Colwood	Logging.
Whittaker, Elliott & McPherson	Jervis Inlet	Logging (suspended operations temporarily).
Rice & Hutchison	Dollarton	Ditto.
Charles S. Copley	Cloverdale	Logging.
Clark & Goddard	Atlin	"
Murayama, A.	666 Alexander St., Vancouver	"
N. E. Champayne	Prince George	"
S. Leary	Nakusp	"
The Lapan Logging Co., Ltd.	Jackson Bay	"
United Logging Co., Ltd.	139 Water St., Vancouver	"
Laughlin & Reid	Egmont	"
Houss & Jenkins	Seechelt	"
A. S. Williams, Ltd.	Rogers Bldg., Vancouver	"
A. Kelch	Craigellachie	"
Roy Denel	S Mill Camp, Revelstoke	"
John Mann	North Vancouver	Logging (suspended operations temporarily).
A. S. Deighton	Vananda	Logging.
Harry Fiddick	Nanaimo	"
Walker's Camp	909 Metropolitan Bldg., Vancouver	Logging (suspended operations temporarily).
Abe Mason	Seechelt	Logging.
Berby Logging Co.	553 Front St., New Westminster.	"
James Tussee	Chase	"
Jno. Robillard	"	"
Norman McLean	"	Logging (suspended operations temporarily).
T. L. Kennedy & Co.	Fourteenth and Hendry Ave., North Vancouver	Logging.
Ethelbert Collins	Coghlan	Logging (suspended operations temporarily).
Wooldridge Bros.	Port Clements	Logging.
Chas. Blair	Lynn Creek P.O.	Logging (suspended operations temporarily).
McLeod Timber Co., Ltd.	Pacific Bldg., Vancouver	Logging.
S. Blaney	1970 McNichol Ave., Vancouver.	"

LOGGING—Continued.

Firm.	Location.	Industry.
Burns & Davidson	924 Hastings St. W., Vancouver..	Logging.
W. L. Mackin	Chilliwack	Logging (suspended operations).
Simplex Mills Manufacturing Co.	704 Birks Bldg., Vancouver	Ditto.
Seth Klesta	Solsqua	Logging.
K. E. Veregin & N. Tlatoff	Thompson Island	Logging (suspended operations).
C. E. Garrett & Bell	607 Vancouver Block, Vancouver.	Ditto.
Leonard Iroyo	McLure P.O.	Logging.
Murphy & Hanson	1205 Dominion Bldg., Vancouver.	Logging (suspended operations).
W. C. Wood	Athalmer	Ditto.
Querson-Smith Logging Co.	Bishop's Landing	"
The Mutual Co-operative Logging Co..	Booker's Lagoon, Broughton Island	Logging.
Rivers Logging	1312 Standard Bldg., Vancouver.	"
White Spruce Co., Ltd.	Fernie	"
Frank Chappay, c/o C. F. Kealy	614 Dominion Bldg., Vancouver..	"
George Pancoua	Seechelt Inlet	Logging (suspended operations).
C. C. Thompson	Grand Forks	Ditto.
W. J. Allan	Whytecliff	"
George Anderson	Glen Walker	"
Etchepare & Partners	Carmi	Logging.
Little Logging Co.	1212 Douglas St., Victoria	"
Charles Germyn	Lynn Valley	"
Alluvia Lumber Co., Ltd.	Sullivan P.O.	Logging (suspended operations).
W. S. Bird	636 Cornwall St., Victoria	Ditto.
John Grant	419 Keith Road W., North Vancouver	Logging.
Thos. Reid	Capilano P.O.	"
Bruhn & McIntyre	Sicamous	Logging (suspended operations).
Frederick W. Dale	Hardwick Island	Ditto.
Walters & Gidlow	Lund	Logging.
Marshall Bros.	Port Haney	"
Tway Logging Co.	Simoon Sound	Logging (suspended operations).
McQueen Bros.	Sproat, via Arrowhead	Logging.
E. Deschamos	Rossland	"
E. A. Hillman	Beaton	"
The Bella Coola Logging Co., Ltd.	Bella Coola	"
R. M. Hutchison	Nakusp	"
Clark Mill Co., Ltd., c/o Wilson & Wilson	805 Dominion Bldg., Vancouver..	"
D'Ersby Dewar Co.	122 Cordova St. W., Vancouver..	"
Bernard Timber & Logging Co., Ltd. ..	Orford Bay	"
E. N. Freding	Princeton	Logging (suspended operations).
Allison & Murchy	"	Logging.
Stainey Wayt & Co.	Blacknay Point	Logging (suspended operations).
T. A. Kelly	401 Bank of Ottawa Bldg., Vancouver	Logging.
Collins & Round	Quesnel	Logging (suspended operations).
Sinclair McLean	Fort Fraser	Logging.
Gordon McArthur & Co.	1212 Standard Bldg., Vancouver.	"
Chas. McGarrigle	Northfield	"
P. D. Garden	Moxie	"
J. A. Mitchell	Merville	"
Victor Enquest	Solsqua	"
William Louie	Chase	"
Allan Simpson	Cobble Hill	"
Spicer & Fraser	Courtenay	Logging (suspended operations).
George Albert Coburn	Shuswap	Logging.
A. V. Armstrong	Sperling	"
Robert Somerville	Birgade Lake	"
A. Roberts	Kettle Valley	"
N. Peterson	Merritt	"
Anstln Co.	Prince George	"
MacKenzie & Siddell	Port Moody	"
Angus & Nelson	Silverdale	Logging (suspended operations).
Swan Bros.	Saltspring Island	Ditto.
Alex. McQueen	Dollarton	"
Clowholm Lumber Shingle Co.	722 Rogers Bldg., Vancouver	"
E. H. Belveal	Deep Harbour	Logging.
Fred Johnson	Sardis	Logging (suspended operations).
A. Yarco	1130 Cotton Drive, Vancouver ..	Logging.
Fulton, Sumner & Holbrook	Egmont	"
Helen Bay Logging Co., Ltd.	Carriden Bay	"
James Graham	Engen	"
I. T. Sim	Solsqua	"
Jack Laitio	"	"
Alfred Cosh	Metchoish	"

LOGGING—Continued.

Firm.	Location.	Industry.
Henry C. Chamberlain	c/o Pacific Lumber & Trading Co., Ltd., Vancouver	Logging.
Cargill Co. of Canada, Ltd.	505 Vancouver Block, Vancouver.	"
R. Hanna	Bruce's Landing	"
R. Barlow	Arrowhead	Logging (suspended operations).
S. Yoshida	c/o D. J. O'Brien, Logging Co., Ltd., Vancouver	Logging.
Con Hagan	Dumaresq Camp, Wilber Channel	"
Frank Lamora	315 Dominion Bldg., Vancouver..	"
Otto Sirvlo	Solsqua	"
Pringle & Watson	Kuper Island	"
Clarence B. Dougan, c/o P. B. Anderson	325 Pacific Bldg., Vancouver ..	"
Charter Lumber Co., Ltd.	103 Union Bank Bldg., Vancouver	Logging (suspended operations).
Elk Bay Timber Co.	811 Metropolitan Bldg., Vancouver	Logging.
Gambier Timber Co., Ltd.	Port Haney	"
Denman Island Logging Co.	Denman Island	"
Henry March	Cowichan Lake	"
C. E. Johnson	Kootenay Lake Shingle Co., Ltd. Salmo	Logging (suspended operations).
J. H. Barmby	Whonnock	Ditto.
The Shamrock Logging Co.	509 Pacific Bldg., Vancouver	Logging.
Dykes & Warren	330 Selmour St., Vancouver	"
The Sydney Logging Co., Ltd.	408 Pacific Bldg., Vancouver	"
John A. Smith, trustee for creditors of the Burrard Sawmills, Ltd.	408 Pacific Bldg., Vancouver	"
J. E. Jordan & Horsfall	Duncan	"
Howard White	Lynn Creek	"
Kawakawa Lumber Co.	Hope	"
W. L. Barrett	Whaletown	"
Henry G. Andrews	Mount Lehman	Logging (suspended operations).
Provincial Lumber Co.	Kennedy	Logging.
Anderson & Ducharme	Othello	"
The Prairie Logging Co., Ltd.	512 Board of Trade Bldg., Vancouver	"
S. P. Pond	Nelson	"
Geo. Browse	Langley Fort	Logging (suspended operations).
The Port Lumber Co., Ltd.	Port Moody	Logging.
Mayne Timber & Trading Co., Ltd.	Sechart	"
Elliott Lumber & Shingles Co., Ltd. ..	335 Princess St., Vancouver	"
James Vincent	Capilano	"
Fred N. Norton	Raza Island	"
Peck Logging Co., Ltd.	503 North West Bldg., Vancouver	"
R. Hogino	670 Thurlow St., Vancouver	"
Ingam E. Clark	Coghlan	"
E. Dilts	Waldo	"
Elias Alarie	Solsqua	"
Georgia Lake Logging Co., Ltd.	103 Carter-Cotton Bldg., Vancouver	"
Jamieson & Israel	Buckley Bay	"
Hall & Patterson	Grand Forks	"
James S. Logan	Merritt	"
Nightongale & Young	Ganges	"
The Valley Mills, Ltd.	614 Dominion Bldg., Vancouver..	"
J. N. & F. Baxter	613 Carter-Cotton Bldg., Vancouver	"
Geo. Way & Co.	Swanson Bay	"
Waland, Doig & Stronberg	"	"
Jarvis & Collins	"	"
Bert Sprinkling	Saltspring Island	"
R. Lum	Rock Creek	"
O'Donnell & Madge	"	"
W. J. Carmichael	Ladysmith	"
Quenville & Hane	Swanson Bay	"
Soam Ama	Newton	"
D. J. McDonald	Kamloops	"
Arrow Lakes Lumber Co., Ltd.	"	"
H. S. Rowling	1603 Fell Ave., North Vancouver.	"
K. Terakura	335 Princess Ave., Vancouver ..	Logging (suspended operations).
Booth & Hanson	Sayward	Logging.
Bailey Johnson Logging Co., Ltd.	833 Hastings St. W., Vancouver.	"
A. O'Kelly	Victoria	"
Port Renfrew Logging & Lumber Co., Ltd.	Port Renfrew	"
John Eck & Co.	Alvin	"
The Falls Logging Co.	Duncan	"
Chas. H. Carter	1562 William St., Vancouver	"
W. E. Aickin	726 Rogers Bldg., Vancouver	"
Anderson & Johnson	Chase	Logging (suspended operations).
Cliffe, Guthrie & Higgins	Comox	Logging.
C. E. Myren, c/o P. B. Anderson	325 Pacific Bldg., Vancouver	"
Straits Cedars, Ltd.	302 North West Bldg., Vancouver	"
J. C. Dunwaters	Okanagan Lake	"

LOGGING—Continued.

Firm.	Location.	Industry.
H. W. Barr	Wasa	Logging (suspended operations).
Palmer Owen Logging Co.	1326 Standard Bank Bldg., Vancouver	Logging.
Cherry Point Logging Co.	209 Belmont Bldg., Victoria	"
George Campbell	Dunster	"
The Killarney Loggers, Ltd.	728 Rogers Bldg., Vancouver	"
Lewis E. Jamison	McBride	"
Sponberg & Johnson	Swanson Bay	"
Herrewig & Scothorn	Sointula	"
Frank Timmis	Parkdale, Howe Sound	"
Gower & Kennedy	Lang Bay	"
G. E. Holmes	Cloverdale	"
W. McGatty	Port Moody	Logging (suspended operations).
Frank Higgins	East Bella Bella	Logging.
Maxwell & Bings	Saltspring Island	"
Thomas Spendlove	Lynn Creek	"
R. M. Denny	239 West Twenty-second St., North Vancouver	"
W. Marlow	Sooke Road, R.R. No. 2, Victoria	"
Kangahure Yamada	143 Dunlevy Ave., Vancouver ..	"
Trudell & Williams	Ladysmith	"
Murphy Bros.	606 Vancouver Block, Vancouver.	"
A. Redpath	Aldergrove	"
R. E. Chittick	Nakusp	"
The Campbell Logging Co., Ltd.	1404 Dominion Bldg., Vancouver.	"
Greenway Logging Co.	Greenway Sound	"
Widman Bros.	315 Dominion Bldg., Vancouver..	"
H. N. Horel	Kennedy Station on B.C.E. Rly.	"
J. W. Gordon	Squamish	"
J. Myers	1840 Sixth Ave. E., Vancouver..	"
San Juan Box Co., Ltd.	Port Renfrew	"
J. E. Haldercroft	McBride	Logging (suspended operations).
A. W. Brouse	Lasqueti Island	Logging.
Alex. Stewart	Ladysmith	Logging (suspended operations).
The West Coast Loggers, Ltd.	Foot of Smythe St., Vancouver..	Logging.
H. Sheaves & W. Reutley	Port Mann	"
Sumner & McDonald	Port Neville	Logging (suspended operations).
The Deserated Bay Logging Co., Ltd. ...	421 Vancouver Block, Vancouver ..	Logging.
Silver Creek Logging Co.	Mission City	"
Delin Singh & Namu	Seechelt	"
John Robertson	Strawberry Hill	Logging (suspended operations).
Adair & Clark	Hancy	Logging.
Pye & Pye	Minstrel Island	"
S. L. Romano	772 Georgia St. E., Vancouver ..	"
Chas. H. Murphy	535 Pender St. W., Vancouver ..	Logging (suspended operations).
Martin & Lundquist	Gibson's Landing	Ditto.
D. A. Brewster & Co.	Tribune Channel, Thompson Sound ..	Logging.
A. C. Carlin	1421 Richardson St., Victoria ...	Logging (suspended operations).
Eagle Lake Logging Co.	Newlands	Logging.
S. Ellingsen	c/o Munn & Kerr Timber Co., Churchhouse	"
A. R. Crooks	Capilano	"
Phillip H. Welch	Crofton	"
The Interior Cedar Co., Ltd.	Revelstoke	"
Polson & Anderson	Malakwa	"
S. G. McNutt	Belcarra, Burrard Inlet	"
F. W. Sentell	Langley Prairie	"
H. A. H. Churchill & Mouat	Ganges	"
T. Shimoisaka	1214 Dominion Bldg., Vancouver.	"
Robert Russell	Capilano P.O.	"
Allen & Gordon	Blind Channel	"
Eliason, Eliason & Shelton	Green Point Rapids	"
Mosher Logging Co.	Chancellor Channel	"
McKinnon & Rusch	Rock Creek	"
F. Soucie	Coalmont	"
James Simmons	Cariden Bay	"
Dumaresqu & Martin	Wellbore Channel	"
Nowat Bros.	Alta Lake	"
R. Archibald	Clowholm Falls via Seechelt	"
Mitchell Cameron	Langley Prairie	"
Matilot Logging Co.	Alert Bay	"
Hogan, Bicknell, Inrlg & M. Robertson..	Wadhams Cannery	"
Fernmento & Heywood	Cowichan Station	"
Ed. Johnson & Co.	Solsqua	"
Barber & Gibbon	Lasqueti Island	"
Gaskins & Welch	Alert Bay	"
Dondale & Jones	Grand Forks	"

MACHINE-SHOPS AND FOUNDRIES.

Firm.	Location.	Industry.
Cranbrook Foundry Co.	Cranbrook	Foundry.
Victoria Brass & Iron Works	Pioneer St., Victoria	Brass and iron works.
Boundry Iron Works, Ltd.	Grand Forks	Foundry.
Golightly Bros., Ltd.	763 Powell St., Vancouver	Machine-shop.
W. J. Ellis & Co.	Kamloops	"
A. P. Jones & Johnson	Kelowna	"
Geo. R. Mitchell	1050 Seaton St., Vancouver	"
Frank Osborne	Lund	"
Cormack & Annard	Foot of Tenth St., New Westminster.	"
Nanaimo Foundry	Nanaimo	"
Nelson Iron Works	Nelson	Foundry and machine-shop.
New Westminster Foundry Co., Ltd. ..	New Westminster	Foundry.
Heaps Engineering Co., Ltd.	"	Foundry and machine-shop.
W. R. Jaynes	726 Front St., New Westminster	Machine-shop.
Westminster Iron Works	66 Tenth St., New Westminster..	"
Schaafe Co., Ltd.	Granville Island, Vancouver	"
Vulcan Iron Works, Ltd.	Industrial Island, Vancouver	"
Weeb & Gifford	Front St., New Westminster	"
E. C. Atkins & Co., Ltd.	109 Powell St., Vancouver	"
A. W. Lepage	773 Georgia St. W., Vancouver..	"
Burrard Iron Works	144 Alexander St., Vancouver ..	"
Chappell Bros.	Georgia St., foot of Denman St., Vancouver.	"
V. M. Dafoe	1200 Powell St., Vancouver	"
Wesley B. Earle	2102 Eleventh Ave. W., Vancouver	Manufacturing stoves.
H. Disston & Sons, Ltd.	36 Powell St., Vancouver	Machine-shop.
National Cash Register Co. of Canada, Ltd.	524 Pender St. W., Vancouver...	"
Easthope Bros.	1729 Georgia St. W., Vancouver..	"
Empire Manufacturing Co., Ltd.	1201 Sixth Ave. E., Vancouver..	"
Gibbs Tool & Stamping Works	356 Dufferin St. W., Vancouver..	"
Hall Machine Works	1225 Alberni St., Vancouver	"
Vancouver Stove Works	392 Dufferin St. W., Vancouver..	Iron-foundry.
Mainland Engineering	422 Railway St., Vancouver	Machine-shop.
Maritime Motor Car Co., Ltd.	1560 Thirteenth Ave. W., Vancouver.	"
R. M. Moore & Co., Ltd.	916 Pender St. W., Vancouver ..	Gas-lighting and machine-shop.
M. O. Olson	Cor. Gore Ave., Vancouver	Machine-shop.
J. Houston	241 Prior St., Vancouver	"
Ross & Howard Iron Works	1400 Powell St., Vancouver	Machine-shop and foundry.
Simonds Canada Saw Co., Ltd.	554 Beatty St., Vancouver	Machine-shop.
Pearson Iron & Wire Works	City Market, Main St., Vancouver	Ornamental-iron works.
Summer Metal Works	614 Bidwell St., Vancouver	Brass-foundry.
Terminal City Iron Works	1949 Albert St., Vancouver	Machine-shop.
United Motor Agency of B.C.	940 Richards St., Vancouver	"
Vancouver Brass Works	1304 Keefer St., Vancouver	Brass-foundry.
Vancouver Engineering Works	519 Sixth Ave. W., Vancouver ..	Machine-shop.
Vancouver Machinery Depot, Ltd.	1156 Sixth Ave. W., Vancouver..	"
Wilson's Brass Foundry	22 Dufferin St. E., Vancouver ..	Brass-foundry.
Letson & Burpee, Ltd.	198 Alexander St., Vancouver	Machine-shop.
S. M. Morris & Co.	2139 Cedar St., Vancouver	Ornamental-iron works.
North Shore Iron Works, Ltd.	North Vancouver	Machine-shop.
Canadian Water Wheel Co.	Industrial Island, Vancouver	"
Akerberg & Thomson	Prince Rupert	"
Rupert Marine Iron Works Co.	"	"
Imperial Machine Works	"	"
Rose & Wenborn	Steveston	"
Armstrong Bros.	134 Kingston St., Victoria	"
Albion Stove Works, Ltd.	Victoria	Manufacturing stoves.
Marine Iron Works	"	Machine-shop.
Hafer Machine Co., Ltd.	"	"
Hutchinson Bros. & Co.	"	Machine-shop (suspended operations).
Lofts & Bosustow	Wharf and Broughton, Victoria..	Machine-shop.
Ramsay's Machine Works	1630 Store St., Victoria	"
Victoria Machinery Depot	Victoria	"
Marsland Iron Works	503 Powell St., Vancouver	Foundry.
Ideal Iron Works	123 Powell St., Vancouver	Machine-shop.
Artstrong & Co.	2784 Fourth Ave. W., Vancouver	"
McAllister Spring Co., Ltd.	1128 Richards St., Vancouver ..	Manufacturing springs.
Patterson Boiler Works	Heatley Ave., Vancouver	Machine-shop.
Hendry Foundry Co., Ltd.	360 Front St., Vancouver	Iron-foundry.
Progressive Engineering Works	900 Powell St., Vancouver	Machine-shop.
Haskins & Elliott	516 Howe St., Vancouver	"
Industrial Iron Works	1265 Parker St., Vancouver	Iron-foundry (suspended operations).
Mainland Boiler Works	422 Railway St., Vancouver	Manufacturing steam-boilers.
E. J. Parker	310 Belleville St., Victoria	Machine-shop.
Western Machine Works, Ltd.	1705 Georgia St. W., Vancouver..	"
J. F. Neilson	New Westminster	"
A. Rogers & Co.	Vernon	"
Wonder Pump & Engine Co., Ltd.	942 Pender St. W., Vancouver..	"
Wallace Foundry Co., Ltd.	Granville Island, Vancouver	"
B.C. Iron Works	Victoria	Boiler-makers.
Frank E. Mitchell	672 Alexander St., Vancouver ..	Machine-works.
Watson Canadian Toys, Ltd.	616 Davie St., Vancouver	Machine-shop.

MACHINE-SHOPS AND FOUNDRIES—*Continued.*

Firm.	Location.	Industry.
Star Brass Foundry	Lorne & Columbia, Vancouver ..	Brass-foundry.
The Vancouver Spring Co., Ltd.	1368 Richards St., Vancouver ..	Manufacturing springs.
Cowie Machine Co.	Nanaimo	Machine-shop.
Murray-Latta Machine Works	619 Bidwell St., Vancouver	"
Vivian Gas Engine Works	1090 Sixth Ave. W., Vancouver ..	"
Harold C. Gunson	852 Johnson St., Victoria	"
Globe Iron Works	1815 Pandora St., Vancouver ..	"
John A. Thomson Machinery Co.	Pacific Bldg., Vancouver	"
Smith Robinson & Co.	1063 Hamilton St., Vancouver ..	"
Columbia Iron Works	345 Dufferin St., Vancouver	"
Vancouver Motor & Cycle Co.	827 Hastings St. W., Vancouver ..	"
J. R. Campbell	Kelowna	"
Earnest Clark Melton	1122 Richards St., Vancouver ..	"
W. E. Walter, Ltd.	54 Water St., Vancouver	"
William Ralph, Ltd.	534 Pender St. W., Vancouver ..	"
Clendon Tool & Stamping	135 Hastings St. W., Vancouver ..	"
Cawston Machinery Co., Ltd.	605 Bank of Nova Scotia Bldg., Vancouver.	"
Weir & Taylor	Front St., New Westminster	"
Maple Leaf Iron Works, Ltd.	425 Alexander St., Vancouver ..	"
A. & K. Machine Shop	119 Main St., Vancouver	"
Samuel R. Jessop	Nanaimo	"
Canadian Summer Iron Works, Ltd. ..	1214 Pender St. E., Vancouver ..	"
Vancouver Boiler Works	456 Dufferin St., Vancouver	"
Vancouver Pipe & Foundry Co., Ltd. ..	500 Beatty St., Vancouver	Foundry.
Denman Engineering Works	613 Dominion Bldg., Vancouver ..	Machine-shop.
Northern Machinery Co., Ltd.	410 Dominion Bldg., Vancouver ..	"
Pacific Standard Motor Works	1687 Georgia St., Vancouver	"
The Heaton Machine Works	1271 Sixth Ave. W., Vancouver ..	"
T. J. Shore Bolt & Nut Manufacturing Co., Ltd.	Vancouver	Manufacturing bolts.

METAL-MINING.

Belmont-Surf Inlet Mines, Ltd.	Surf Inlet	Gold, silver, copper.
Drum Lummon Mines, Ltd.	Vancouver	"
E. T. Patterson	Refuge Bay	Gold, silver
Taylor Engineering Co., Ltd.	Alice Arm	Silver.
H. W. Heidman	Anyox	Silver, gold.
Granby Consolidated M.S. & P. Co.	"	Gold, silver, copper.
Mills Donald	Alice Arm	Gold, silver, lead.
J. McAleenan	"	Silver.
D. L. Pitt	Salmon River	Gold, silver.
Ikeda Mines, Ltd.	Ikeda	Gold, silver, copper.
Smelters Steel Co.	Deau Channel	Iron.
Fred Griffin	Telkwa	Silver, copper.
A. J. Thompson	Usk	Gold, silver, copper.
Maek Orr	Pacific	"
W. G. Norrie-Lowenthal	New Hazelton	Gold, silver, lead, zinc.
D. C. Simpson	Smithers	Gold, silver, lead.
Frank Gulndon	Moxie	Silver, lead.
Thompson & McKinney	Kimberley	"
Consolidated M. & S. Co.	Moxie	"
J. E. Stoddart	Kimberley	Silver, lead, zinc.
Paul Denhart	Toby Creek	Gold, silver, lead.
Wm. Adkins	Briseo	Silver, lead.
R. R. Bruce	Feld	"
W. A. Krippachne	Invermere	"
S. S. Fowler	Slade Creek	"
D. Brandon	Riondel	"
W. E. Zwicky	Silverton	"
F. R. Wolfe	Zwicky	Silver, lead, zinc.
H. McVlear	Ainsworth	Silver, lead.
C. F. Olsen	"	Silver, gold, lead.
H. Giegerich	"	Silver, lead.
Consolidated M. & S. Co.	"	"
E. Johnson	"	"
J. J. Brochier	Kaslo	"
W. E. Newton	Hamill Creek	"
J. C. McDougall	Kaslo	"
Kennedy & Bridge	Ainsworth	"
R. J. Hughes	"	"
J. W. Smith	Kaslo	"
C. F. Caldwell	Ainsworth	"
W. H. Burgess	Kaslo	"
G. A. Petty	Kaslo	Gold, silver, lead.
J. P. McFadden	Sandon	Silver, lead.
W. R. Will	New Denver	Gold, silver, lead.
L. J. McAttee	"	Gold, silver.
C. Cunningham	Silverton	Silver, lead, zinc.
A. W. McCune	Sandon	Silver, lead.
H. H. Armstrong	"	Gold, silver, lead.
M. J. Byrne	Silverton	Silver, lead.
	Sandon	"

METAL-MINING—Continued.

Firm.	Location.	Industry.
C. Cunningham	Sandon	Silver, lead, zinc.
J. P. McFadden		Gold, silver, lead, zinc.
Thos. Trenergy	Rosebery	Silver, lead.
A. W. B. Allen	Zlncton	Silver, zinc.
H. Cleaver	New Denver	Gold, silver, lead.
T. J. Lloyd		Gold, silver.
O. V. White	Sandon	Silver, lead.
J. M. Harris	"	Gold, silver, lead.
W. G. Clark		Silver, lead.
W. A. Cameron	Three Forks	" "
J. Anderson	Sandon	" "
J. B. White	"	Silver, lead, zinc.
G. H. Aylard	Silverton	Silver, lead.
H. D. Curtis	Springer Creek	Silver.
C. E. Cartwright	"	Silver, lead.
H. D. Lea	Slocan	"
S. S. Fowler	Enterprise Creek	Gold, silver.
W. A. Buchanan	Slocan	Silver, lead.
E. F. Roche	Enterprise Creek	Silver.
A. L. McPhee	Slocan	Gold, silver.
W. H. Turner	Nelson	Silver, lead.
W. Waldbeser	Salmo	Gold, silver, copper.
Vincent Development Co.	Granite	Silver, lead.
Consolidated M. & S. Co.	Kokanee	Gold, silver.
A. D. Westby	Erie	Gold, silver, lead.
H. E. Forster	Burton	Gold, silver, copper.
F. S. Peters	Rossland	" " "
John S. Baker	"	Silver, copper.
P. S. Couldrey	"	Gold, copper.
J. W. Evans	Renata	Gold, silver, lead.
Consolidated M. & S. Co.	Rossland	" "
W. B. Dornberg	Illecillewaet	Silver, lead.
J. Anderson	Ferguson	Fluorite.
W. J. Banting	Lightning Peak	Gold, silver.
Consolidated M. & S. Co.	Kennedy Creek	Gold, silver, lead.
Lewis Johnson	Grand Forks	" " "
F. F. Ketchum	Wallace Mountain	Silver, lead.
P. E. Crane	Beaverdell	Gold, silver, lead.
J. P. Kelly	"	" " "
G. Hambly	"	Silver.
L. Sortoine	Greenwood	Silver, lead.
J. McKellar	Wallace Mountain	Gold, silver.
Consolidated M. & S. Co.	Elholt	Silver, lead.
Granby Consolidated M.S. & P. Co.	Phoenix	Gold, silver, copper.
Canada Copper Corporation, Ltd.	Greenwood	" " "
E. G. Cummings	Wallace Mountain	" " "
A. J. Morrison	Greenwood	Silver, lead.
H. B. Morley	Beaverdell	Gold, silver, lead.
E. Nordman	"	" " "
J. Cunningham	Phoenix	Silver.
E. Williamson	Kettle River	Gold, silver, copper.
G. A. Rendell	Lightning Peak	Gold, silver, lead.
D. McEachern	Olalla	Silver, lead.
E. W. Condit	Keremeos	Gold, silver, copper.
Gomer P. Jones	Hedley	Gold, silver.
F. F. Foster	Princeton	Gold, arsenic.
F. M. Hawkes	Stump Lake	Silver, copper.
F. Calvert	Kruger Mountain	Gold, silver, lead, copper.
R. R. Hedley	Stump Lake	Magnesium sulphate.
J. G. Miller	Basque	Gold, silver, lead.
A. Wallinder	Kamloops	Magnesium sulphate.
C. E. Max	"	Gold, silver, copper.
W. Thompson	Yale	Silver, lead.
Stewart-Calvert Co.	Clinton	Gold, silver.
F. A. Brewer	Cadwallader Creek	Magnesium sulphate.
A. F. Noel	"	Gold.
A. Ferguson	"	Gold, silver.
E. J. Donohue	Britannia Beach	Gold, silver, copper.
James Forbes	Vananda	Silver, copper.
James Raper	"	"
F. H. Rosher	Quathiaski	Gold, silver, copper.
W. H. Lee	Vananda	Iron.
G. H. Kilburne	Cowichan Lake	Gold, silver, copper.
C. H. Dickie	"	Manganese.

MANUFACTURE OF PAINTS, TURPENTINE, AND OIL-REFINERIES.

British American Paint Co., Ltd.	Victoria	Manufacturing paint.
Stancland Co., Ltd.		" "
Martin-Senour Co., Ltd.	1505 Powell St., Vancouver	"
Pacific White Lead Co., Ltd.	Industrial Island, Vancouver	Manufacturing white lead.
Ayers Varnish Co.	Vancouver	Manufacturing paint and varnish.

MANUFACTURE OF PAINTS, TURPENTINE, AND OIL-REFINERIES—Continued.

Firm.	Location.	Industry.
B.C. Impermeate Co., Ltd.	328 Rogers Bldg., Vancouver	Manufacturing a composition rendering substances impervious to damp.
British Columbia Refining Co., Ltd.	1043 Hamilton St., Vancouver ..	Oil-refinery.
Crown Paint Co.	24 Cordova St. E., Vancouver....	Manufacturing paint.
Henry Darling	28 Powell St., Vancouver	" "
Imperial Oil Co., Ltd.	Ioco	Oil-refinery.
Dust Control Co.	2246 Commercial Drive, Vancouver	Manufacturing floor-oil and mops.
Douglas Fir & Turpentine Co., Ltd. ...	Vancouver	Manufacturing turpentine.

PULP AND PAPER MILLS.

Powell River Co., Ltd.	Powell River	Pulp and paper.
Pacific Mills, Ltd.	Ocean Falls	" "
Whalen Pulp & Paper Mills, Ltd.	Port Alice	Pulp.
" "	Swanson Bay	"
" "	Mill Creek, Howe Sound	"
Western Canada Pulp & Paper Co.	Port Mellon	"
Beaver Cove Pulp & Lumber Co.	Beaver Cove	"

SASH AND DOOR FACTORIES.

John Arnot & Sons	Vancouver	Sash and door factory.
S. C. Smith Lumber Co., Ltd.	Vernon	" " "
James Brooks Woodworking Co., Ltd. ..	East Burnaby	" " "
Kamloops Sash & Door Factory	Kamloops	" " "
Nelson Sash & Door Factory	Nelson	" " "
T. H. Waters Co.	"	" " "
Galbraith & Sons	New Westminster	" " "
Cedar Cove Sash & Door Co., Ltd.	1101 Sixth Ave. W., Vancouver ..	" " "
F. J. Becker	Armstrong	" " "
Cornish & Cooper	245 Dufferin St., Vancouver	" " "
Johnson Sash & Door Factory	854 Sixth Ave. W., Vancouver ..	" " "
E. H. Shockey	Prince Rupert	" " "
McLeod Dunn Watson Co., Ltd.	1260 Charles St., Vancouver	" " "
Canada Sash & Door Co.	136 Lorne St. W., Vancouver	" " "
Reynolds Sash & Door Co.	170 Cordova St. E., Vancouver ..	" " "
Robertson & McLaughlin	1758 Fifteenth Ave. E., Vancouver	" " "
Mark Arbuthnot	101 Dufferin St., Vancouver	" " "
R. D. Helmer	996 Sixth Ave. W., Vancouver ...	" " "
Reid Sash & Door Factory	1635 Third Ave. W., Vancouver..	" " "
Nanaimo Lumber Co., Ltd.	Nanaimo	" " "

SAWMILLS AND SHINGLE-MILLS, ETC.

Abbotsford Timber & Trading Co.	Abbotsford	Sawmill.
A. J. Pringle	Adelphi P.O.	"
O. J. Hoffstram	Rolla	"
Sugar Loaf Valley Lumber Co., Ltd. ..	Kamloops	"
Frederick Brand	Alberni	"
Alert Bay Sawmills	517 Granville St., Vancouver ...	Sawmill (suspended operations).
John W. McDonnell, Ltd.	Fanny Bay	Shingle-mill (suspended operations).
Sovereign Lumber Co., Ltd.	Kamloops	Sawmilling.
J. E. Murphy & Co.	Ladner	"
Armstrong Sawmill	Armstrong	"
Chas. Hoover	"	"
George MacKenzie	Nelson	Sawmill (suspended operations).
Diamond Lumber & Shingle Co., Ltd....	Bevelstoke	Shingle-mill.
North Pacific Lumber Co., Ltd.....	Barnet	Planing-mills.
McVicar Shingle Co.	Burquitlam	Shingle-mill.
Barriere Lumber Co.	Barriere	Sawmill (suspended operations).
E. Hendricks	Bella Coola	Ditto.
Nicola Pine Mills, Ltd.	Merritt	Sawmill.
Seabird Shingle Co., Ltd.	Waleach	Shingle-mill.
Hadden Shingle Co., Ltd.	White Rock	"
R. B. McLean Lumber Co.	Cloverdale	Sawmill.
Guarantee Sawmill Co.	Courtenay	Sawmill (suspended operations).
Empire Shingle Co.	Craig's Crossing	Shingle-mill (suspended operations).
Daniel Kilpatrick	Courtenay	Sawmill.
Coombs Shingle Mill	Coombs	Shingle-mill.

SAWMILLS AND SHINGLE-MILLS, ETC.—Continued.

Firm.	Location.	Industry.
Longworth Lumber Co.	Cariboo	Sawmill.
Red Mountain Lumber Co.	Penny	"
Lumber Products, Ltd.	902 Credit Foncier Bldg., Van- couver.	Sawmill (suspended opera- tions).
Calyson Lumber Co.	Cloverdale	Sawmill.
Canyon City Lumber Co., Ltd.	Creston	"
Highland Shingle Mills	Capital Hill P.O.	Shingle-mill.
Baskin & Stedman, Ltd.	Nelson	Sawmill.
Reynolds Co., Ltd.	Pacific Bldg., Vancouver	"
Okanagan Sawmill, Ltd.	Enderby	"
The Newlands Sawmills, Ltd.	Prince George	"
Fraser Mills Shingle Co.	Fraser Mills	Shingle-mill.
Canadian Western Lumber Co., Ltd. ..	"	Sawmill.
C. Waters	Fruitvale	"
The Columbia River Lumber Co., Ltd. ...	Golden	"
Thomas Alton	Galena	"
Pioneer Shingle Mills	Victoria Drive, Vancouver	Shingle-mill.
Norris Lumber & Box Co., Ltd.	Grand Forks	Sawmill and planer.
Prince Rupert Lumber Co.	Prince Rupert	Sawmill.
The Saloomit Lumber Co.	Bella Coola	"
Dr. R. H. Barker	Happy Valley	Sawmill (suspended opera- tions).
East Kootenay Lumber Co.	Jaffray	Sawmill.
E. Bashaw Lumber Co.	Dewey	"
Arrow Lakes Lumber Co.	Kamloops	"
Monarch Lumber Co.	"	Sawmill (suspended opera- tions).
Acme Shingle Co.	707 Metropolitan Bldg., Vancouver	Shingle-mill.
P. J. Pearson	Nanaimo	Sawmill (suspended opera- tions).
Northern Mills & Timber Co., Ltd.	405 Winch Bldg., Vancouver	Sawmill.
Crawford Bros.	Kelowna	"
Kelowna Sawmills Ltd.	"	"
Kamloops Sawmills	Kamloops	"
Cowie & Stanhope	Duncan	"
Lumby Sawmills, Ltd.	Lumby	"
Lakelse Lumber Co., Ltd.	Ambury	"
Wm. Boyd	Haleyon	"
Louis J. Duval	Royal Oak	"
Highland Lumber Co., Ltd.	Cowichan Station	"
Phillips-Hoyt Lumber Co.	McKay Station	"
Ernest D. Mayhuc	Malakwa	Shingle-mill.
Eburne Saw Mill, Ltd.	Marpole	Sawmill.
Andrew McGeran	Merritt	"
J. A. Menzies, Ltd.	"	"
W. Powers & Lequme	Midway	"
Hutton Mills	Hutton	"
Cloverdale Milling Co.	Murrayville	Shingle-mill.
Lincoln Mill	New Westminster	Sawmill.
Lowrie Lumber Co.	New Masset, Graham Island	Sawmill (suspended opera- tions).
H. G. Lambert Co., Ltd.	Nelson	Sawmill.
Mankin Lumber & Pole Co.	Hall	"
Western Box & Shingle Co.	Nelson	Mill.
The King Farris Lumber Co., Ltd.	Newton	Sawmill.
Iowa Shingle Co.	806 Yorkshire Bldg., Vancouver ..	Shingle-mill.
Hammond Cedar Co., Ltd.	New Westminster	Sawmill.
Shull Lumber & Shingle Co., Ltd.	"	Shingle-mill.
Beaver River Lumber Co., Ltd.	401 Westminster Trust, New West- minster.	Sawmill.
British Columbia Manufacturing Co. ..	New Westminster	"
Brunette Sawmills Co., Ltd.	"	"
Bucklin Lumber Co., Ltd.	"	"
Timberland Lumber Co., Ltd.	"	"
Westminster Mill Co., Ltd.	"	Manufacturing shingles.
Dominion Shingle & Cedar Co., Ltd. ..	Vancouver	"
Alberta Lumber	Sixth and Willow, Vancouver ...	Sawmill.
Barelay Shingle Mills	924 Metropolitan Bldg., Vancouver	Shingle-mill.
B.C. Box Co., Ltd.	Eburne	Sawmill and box-factory.
B.C. Fire & Cedar Lumber Co., Ltd. ..	Sixth and Laurel St., Vancouver	Sawmill and planing-mill.
British Columbia Mills Timber & Trading Co.	Foot of Dunlevy Ave., Vancouver	Sawmill.
The Alert Bay Sawmills	Alert Bay	Sawmill and logging.
Burrard Sawmills, Ltd.	1211 Dominion Bldg., Vancouver.	Sawmill.
Canada Lumber & Timber Co.	Foot of Smythe St., Vancouver ..	"
Canada Shingle Co., Ltd.	P.O. Box 212, Vancouver	Shingle-mill.
Canadian Robert Dollar Co., Ltd.	Dollarton	Sawmill.
Cedar Cove Sash & Door Co., Ltd.	1101 Sixth Ave. W., Vancouver ..	"
Best Grade Shingles, Ltd.	901 Sixth Ave. W., Vancouver ...	Shingle-mill.
Craig Taylor Lumber	909 Dominion Bldg., Vancouver ..	Sawmill.
Dominion Creosoting & Lumber Co., Ltd.	P.O. Box 143 Vancouver	"
Fred M. Singer Co.	198 Hastings St. W., Vancouver ..	"
False Creek Lumber Co.	935 Sixth Ave. W., Vancouver ..	"
Vancouver Coopers Co.	Foot of Beatty St., Vancouver ..	Sawmill and cooperage.
J. Hanbury & Co., Ltd.	Fourth Ave. and Granville St., Vancouver	Sawmill.
Hastings Shingle Manufacturing Co. ..	1355 Powell St., Vancouver	Manufacturing shingles.

SAWMILLS AND SHINGLE-MILLS, ETC.—Continued.

Firm.	Location.	Industry.
Hunting Merritt Lumber Co., Ltd.	P.O. Box 249, Vancouver	Shingle-mill.
Lake Lumber Co., Ltd.	Qualicum Beach	Sawmill.
Robert McNair Shingles Co.	670 Tharlow St., Vancouver	Shingle-mill.
Pacific Box Co., Ltd.	Foot of Smythe St., Vancouver	Sawmill.
Rat Portage Lumber Co., Ltd.	Vancouver	"
Robertson & Hackett Sawmills	"	"
South Shore Lumber Co., Ltd.	"	"
Nasmyth Lumber Co.	"	Shingle-mill.
Vancouver Cedar Mills	"	Sawmill and shingle-mill.
Vancouver Lumber Co., Ltd.	"	Sawmill and planing.
Star Lumber Co.	1017 Metropolitan Bldg., Vancouver	Sawmill.
M. P. Batterill	Clinton	Sawmill (operated by Northern Construction Co.).
K. Lier Lumber Co.	Penticton	Sawmill.
Alberni Pacific Lumber Co., Ltd.	Port Alberni	Sawmill (suspended operations).
Sewall Lumber & Trading Co., Ltd.	1312 Standard Bldg., Vancouver	Sawmill.
Burden & Watson	Crawford Bay	"
Maple Ridge Lumber Co.	Port Haney	"
Thurston Faville, Ltd.	Port Moody	"
Big Bay Lumber Co.	Georgetown Mills	"
Brooks, Bidlake & Whittall, Ltd.	806 Yorkshire Bldg., Vancouver	Shingle-mill.
Pitt River Shingle Co., Ltd.	Coquitlam	"
Alberni Shingle Co., Ltd.	Port Alberni	Sawmill (suspended operations).
Forest Mills of B.C., Ltd.	Revelstoke	Sawmill.
Revelstoke Lumber Co., Ltd.	Pingston Creek via Arrowhead	"
R. H. Sawyer	Revelstoke	"
McNair & Grahame	Rosedale	Shingle-mill.
Hamilton Lumber Mills, Ltd.	Royal Oak	Sawmill.
Stoltze Manufacturing Co., Ltd.	912 Dominion Bldg., Vancouver	Shingle-mill.
Kootenay Shingle Co., Ltd.	Selma	"
William Crowston & Sons	Soda Creek	Sawmill.
Sardis Shingle Co., Ltd.	Port Moody	Manufacturing of shingles.
G. B. Ferguson & Co.	Six-mile Creek	Sawmill.
W. B. Charters	Sooke	"
W. H. Mager	Salmon Arm	"
Sperling Lumber & Shingle Co.	Sperling	"
Day Shingle Manufacturing Co.	Dewdney	Manufacturing shingles.
Newport Sawmills, Ltd.	Squamish	Sawmill.
H. M. Ellis, Ltd.	118 Pacific Bldg., Vancouver	"
Surrey Shingle Manufacturing Co., Ltd.	Sullivan (B.C.E. Rly.)	Shingle-mill.
L. R. Reilly & Co.	Tappen	Sawmill.
George Little	Terrace	"
Eldorado Lumber Co., Ltd.	330 Seymour St., Vancouver	Sawmilling and logging (suspended operations).
McKee & Milnes	Green Point Rapids	Manufacturing shingles.
John L. Rutton Sawmills	Alexa Lake	Sawmill.
Ross Saskatoon Lumber Co.	Waldo	"
Waneta Power Co., Ltd.	Waneta	"
Summerland Lumber Co., Ltd.	West Summerland	"
Campbell River Lumber Co., Ltd.	White Rock	"
Straits Lumber Co.	Nanoose	"
North River Lumber Co., Ltd.	Thunder River	Sawmill (suspended operations).
A. Tomkinson	Grindrod	Sawmill.
Cameron Lumber Co., Ltd.	Victoria	"
Genoa Bay Lumber Co.	"	"
James Leigh & Sons	"	"
Lemon, Connason & Co.	"	"
Moore-Whittington Lumber Co., Ltd.	"	"
Shawnigan Lake Lumber Co.	"	"
McArter Shingle Co.	"	"
Albert Gorton	Foot of Birch St., Vancouver	Shingle-mill.
Peers & Anderson	Foot of Victoria Drive, Vancouver	Shingle-mill, etc.
C. T. McPhalen & Co.	Hatzie	Shingle-mill.
Carter Bros. Lumber Co.	Vananda	Sawmill.
M. A. Hayes	Armstrong	"
B.C. Iowa Lumber Co., Ltd.	506 Yorkshire Bldg., Vancouver	Sawmill (suspended operations).
Northern Pacific Logging Co., Ltd.	606 Vancouver Block, Vancouver	Shingle-mill (suspended operations).
Mayo Lumber Co., Ltd.	Duncan	Shingle-mill.
Giscome Lumber Co., Ltd.	Pacific Bldg., Vancouver	Sawmill.
Stuart Lake Shingle Co.	Squamish	Sawmill, etc.
McCormick & Orser	South of Revelstoke	Shingle-mill.
B.C. Cattle Co., Ltd.	c/o W. C. Sampson, 1219 Langley St., Victoria	Sawmill.
Sidney Mill, Ltd.	Sidney	Sawmill (suspended operations).
Bentley Lumber Co.	Golden	Sawmill.
Northern Lumber & Mercantile Co., Ltd.	Prince George	Sawmill, etc.
Superior Spruce Mills	817 Metropolitan Bldg., Vancouver	Sawmill.
Masset Inlet Lumber Co.	c/o Weir Machinery Co., 1396 Richards St., Vancouver	Sawmill (suspended operations).
Anthony A. Rerrie	Sperling	Ditto.
		Sawmill, etc.

SAWMILLS AND SHINGLE-MILLS, ETC.—Continued.

Firm.	Location.	Industry.
Smith, Hutchinson Lumber Co., Ltd. . .	909 Dominion Bldg., Vancouver..	Sawmill.
Princeton Coalmont Sawmill	Princeton	Sawmill (suspended operations).
A. J. Graham	Graham's Landing	Sawmill.
E. Kagetsu & Co.	126 Cordova St. E., Vancouver..	"
Sutton & Foote	Trout Lake	Shingle-mill.
The McIay Sawmill	Duncan	Sawmill, etc.
Cedars, Ltd.	510 North West Bldg., Vancouver	Sawmill.
Aleza Lake Mills, Ltd.	Aleza Lake	Sawmill, etc.
Graham Island Spruce & Cedar Co. . .	Prince Rupert	Sawmill.
Hansard Lake Lumber Co., Ltd.	Prince George	Sawmill, etc.
Croydon Lumber Co., Ltd.	Croydon	"
Harbour Lumber Co., Ltd.	Foot of Salisbury Drive, Vancou- ver.	Sawmill.
Gwilt Lumber Co., Ltd.	Courtenay	"
Bainbridge Lumber Co.	Bainbridge	"
Loos Lumber Co.	Loos	Sawmill, etc.
Tynehead Lumber Co.	323 Hastings St. E., Vancouver..	"
P. Bain	Silverdale	Sawmill.
Harrison Lake Shingle Co.	Harrison Hot Springs P.O.	Shingle-mill, etc.
Pacific Tie & Timber Co.	529 Pender St. W., Vancouver..	Sawmill, etc.
Electric Lumber Co.	c/o Weir Machinery, Vancouver	Sawmill.
Renata Lumber Co.	Renata	"
Red Cedar Shingle Co.	Guilford	Shingle-mill.
Penny Lumber Co., Ltd.	Penny	Sawmill, etc.
Mountain Sawmills, Ltd.	Kamloops	Sawmill.
Cranbrook Sawmills, Ltd.	Fort Steele	"
The Milestone Lumber Co.	Castlegar	Sawmill, etc.
Joseph Gawley	Keefers	Sawmill.
Krim Singh	Strawberry Hill P.O.	Sawmill (suspended operations).
Moses Bouchier	Hatzic Prairie, Durien P.O.	Sawmill.
Red Cedar Shingle Co., Ltd.	Foot of Kerr Road, South Van- couver.	Manufacturing of shingles.
North Arm Lumber Co.	South Vancouver	Sawmill.
Harry Hobson	322 Second St. E., North Van- couver.	Shingle-mill.
A. E. Mann	827 Royal Ave., New Westminster	Sawmill, etc.
J. E. Campbell	Avola	Shingle-mill (suspended opera- tions).
Barr Bros.	Mission City	Shingle-mill, etc.
Silverdale Lumber Co., Ltd.	Silverdale	Sawmill, etc.
Sunrise Lumber Co.	Nanaimo	Sawmill.
Gerrard Lumber Co., Ltd.	Gerrard	Sawmill, etc.
Finley McIntosh, McDonald Prendergast, Dingee	Coalmont	Sawmill (suspended operations).
Hamilton Shingles, Ltd.	Arrowhead	Shingle-mill.
I. B. Dennison	Nakusp	Sawmill, etc.
Grand Forks Sawmills, Ltd.	Grand Forks	Sawmill (suspended operations).
North Star Lumber Co., Ltd.	Kamloops	Ditto.
E. C. Walsh Lumber Co., Ltd.	North Vancouver	Sawmill.
J. W. R. & W. J. Potter	Box 566, Victoria	"
Rex Shingle Co., Ltd.	Esplanade and St. George, North Vancouver.	Manufacturing shingles.
Nakusp Lumber Co., Ltd.	Nakusp	Sawmill.
William Lyne	Cariboo Road	Sawmill (suspended operations).
Leask & Boyter	Wasa	Sawmill, etc.
Kenney Bros. Lumber Co.	Terrace	Sawmill (suspended operations).
Gilroy Shingle Co., Ltd.	1129 Standard Bank Bldg., Van- couver.	Shingle-mill.
R. S. Wright, Ltd.	Usk	Sawmill.
Edham Shingle Mills, Ltd.	405 Metropolitan Bldg., Vancouver	Shingle-mill.
Boulder Lumber Co.	Boulder Mill via Nelson	Sawmill.
Port Clements Box & Lumber Co., Ltd.	Port Clements	Sawmill (suspended operations).
William Kernighan	Salmon Arm	Sawmill.
Melrose Shingle Co., Ltd.	White Rock	Shingle-mill.
Frank F. White & J. C. Farris	403 Central Bldg., Victoria	Sawmill.
Thos. Gwilt Shingle Co., Ltd.	Courtenay	Shingle-mill, etc.
Courtenay Lumber Co., Ltd.	" Bldg., Vancouver	Sawmill.
Western Hemlock Mills, Ltd., c/o Wilson & Brady	"	"
McKee & Campbell	Langley Prairie	"
B.C. Shingle Co.	Sperling	Shingle-mill.
Nelson Lumber Manufacturing Co.	Nelson	Sawmill (suspended operations).
The Gibson Lumber & Shingle Co.	1022 Metropolitan Bldg., Vancou- ver.	Sawmill, etc. (assigned).
W. H. Hollard	Lynn Creek	Sawmill, etc. (suspended opera- tions).
Royal Lumber Co.	Usk	Sawmill.
Keefe Lumber Co.	Francois Lake	"
Quesnel Timber & Trading Co.	Quesnel	"
Silver Creek Lumber Co.	807 Dominion Bldg., Vancouver..	"

SAWMILLS AND SHINGLE-MILLS, ETC.—Continued.

Firm.	Location.	Industry.
National Shingle Co.	407 Hastings St. W., Vancouver..	Shingle-mill.
The Border Lumber Co., Ltd.	Deep Creek	Sawmill (suspended operations).
F. M. Smith	Door	Sawmill, etc.
Major C. W. Justice	Ganges	"
Lafontaine Bros.	Golden	Sawmill (suspended operations).
Port Hardy Shingle Co.	Port Hardy	Shingle-mill (suspended operations).
Nolan Lumber Co.	Flagstone	Sawmill (suspended operations).
The Anthony Lumber Co., Ltd.	Aleza Lake	Sawmill.
Economy Lumber Co., Ltd.	Courtenay	Sawmill, etc.
Telkwa Lumber Co.	Telkwa	Sawmill.
F. W. Engeman	Jesmond	Sawmill (suspended operations).
Gulf Sawmills, Ltd.	Seechelt	Shingle-mill.
Brooks & Brooks	Otter	"
Fletcher & Richards Lumber Co., Ltd.	Courtenay	Sawmill.
E. B. de la Giroday	2757 Cambridge St., Vancouver..	Sawmill, etc.
William MacAndrew	Dewar's Wharf, Vancouver	Manufacturing shingles.
Mission Shingle Co.	Mission City	Manufacturing shingles (assigned).
Glenwood Shingle, Tie & Lumber Co. ..	307 Yorkshire Bldg., Vancouver..	Manufacturing shingles.
Coquitlam Shingle Co.	123 Fourteenth Ave. W., Vancouver.	Manufacturing shingles (suspended operation).
Guicheon Cove Lumber Co., Ltd.	702 B.C. Permanent Loan Bldg., Victoria.	Sawmill (suspended operations).
Wall Lillos Shingle Co.	766 Fourteenth Ave. E., Vancouver.	Shingle-mill (suspended operations).
Mills Bros.	Langley Prairie	Shingle-mill.
Campbell & Osborne	Toba Inlet	Sawmill.
Premium Shingle Co., Ltd.	924 Vancouver Bldg., Vancouver ..	Shingle-mill.
Qualicum Lumber Co.	512 Standard Bldg., Vancouver ..	Sawmill.
G. O. Buchanan	1207 Seventh Ave. W., New Westminster.	"
B.C. Lath & Timber Products, Ltd. ...	Sperling	Sawmill (suspended operations).
Norwood Bros.	Quesnel	Ditto.
E. Mallandaine	Creston	Sawmill.
Bevan Lumber Co., Ltd.	Bevan	Shingle-mill.
C. V. Humphrey & O. E. Butler	Capilano	Sawmill.
Harrison Bay Co., Ltd.	New Westminster	Shingle-mill.
Burnaby Lumber Co.	Metropolitan Bldg., Vancouver ..	Shingle-mill (suspended operations).
Haney Lumber & Lath Mills, Ltd.	Yennadon	Sawmill.
The Tyee Lumber Co., Ltd.	Tyee Siding	Sawmill (suspended operations).
T. J. Kirkpatrick	Terrace	Sawmill.
Madina Lumber Co., Ltd.	318 Pacific Bldg., Vancouver ..	Sawmill (suspended operations).
Lion Shingle Co., Ltd.	708 Pacific Bldg., Vancouver ...	Shingle-mill.
M. & M. Sawmill Co., Ltd.	Courtenay	Sawmill.
Cedar Cove Operations, Ltd.	806 Yorkshire Bldg., Vancouver..	Planing-mill.
Charlotte Islands Spruce Products, Ltd.	604 Yorkshire Bldg., Vancouver..	Shingle-mill.
Masset Timber Co., Ltd.	708 Pacific Bldg., Vancouver ...	Sawmill.
Wm. D. Lukens	Palling	"
The Frondeg Lumber Co.	Cobble Hill	"
Northern B.C. Timber Co.	Smithers	"
W. H. Scoutin	Kamloops	"
Aldergrove Sawmills, Ltd.	Aldergrove	"
Yellow Fir Lumber Co.	Duncan	"
Chase & Campbell Shingle Co., Ltd.	40 Inns of Court Bldg., Hamilton St., Vancouver	Shingle-mill (suspended operations).
Maddaugh, Huggard & Nichols	Fernridge	Sawmill.
Baker, Malcolm & Doherty	Penticton	"
H. McD. Ferguson	Haney	"
McNair Lumber & Shingle Co., Ltd.	North Vancouver	Shingle-mill.
The Brennan Lake Lumber Co., Ltd.	Wellington	Sawmill.
James Taylor	Hope	Sawmill (suspended operations).
The Westminster Shook Mills, Ltd.	New Westminster	Sawmill.
Webber Lumber Co.	Port Haney	"
Webster, Black & Co.	Fraser Lake	"
Townsite Lumber Co., Ltd.	Foot of Windermere St., Vancouver.	Sawmill (suspended operations).
Acme Lath Co.	2022 Douglas St., Victoria	Lath-mill.
North Shore Shingles, Ltd.	Cor. Esplanade and St. George's St., North Vancouver.	Shingle-mill.
W. A. MacDonald Lumber Co.	Barriere	Sawmill.
Dimension Lumber Co., Ltd.	401 Westminster Trust Bldg., New Westminster.	Sawmill, etc.
Sicamons Saw Mills, Ltd.	306 Victoria St., Kamloops	Sawmill, etc. (suspended operations).
Keen Shingle Co.	Port Alberni	Shingle-mill (suspended operations).
Errington Lumber Co.	Coombs	Sawmill.

SAWMILLS AND SHINGLE-MILLS, ETC.—*Continued.*

Firm.	Location.	Industry.
Somerton & Profit	Powell River	Shingle-mill.
Myntti, Puska, Lata Make & Karst	Webster's Corner	Sawmill.
Fanny Bay Lumber Co., Ltd.	Cumberland	"
Brian Briscoe	Prince George	"
Henry Proctor	Cowichan Bay	"
Empire Sawmills, Ltd.	405 Bank of Nova Scotia Bldg., Vancouver.	"
Diamond Lath Mills, Ltd.	Port Hammond	Lath-mill.
Champion Shingle Co., Ltd.	8017 Columbia Ave., South Van- couver.	Shingle-mill (suspended opera- tions).
Harrison, Bates & Hanwell	Port Hammond	Lath-mill.
Green River Lumber Co.	Rethel	Sawmill.
Kettle Valley Tie & Timber Co.	Penticton	Sawmill, etc.
North Vancouver Lath Co.	North Vancouver	Manufacturing Lath.
Union Shingle Co., Ltd.	Fraser Ave. and River Road, South Vancouver.	Manufacturing Shingles.
Sahtlam Lumber Co., Ltd.	Duncan	Sawmill.
Wilson Shingle Co., Ltd.	Qualicum	Shingle-mill (suspended opera- tions).
Hope Sawmill Co.	Floods P.O.	Sawmill.
Red Mountain Shingle Co.	Silverton	Shingle-mill (suspended opera- tions).
Naruke & Sato	West Summerland	Sawmill.
Forest & Mines Products, Ltd.	Fort Steele	"
Tansor Lumber Co., Ltd.	Duncan	"
Lawrence & Workenaw	Stewart	Sawmill (suspended opera- tions).
The Bonsall Creek Lumber Co., Ltd.	Westholme	Sawmill.
North West Lumber Co., Ltd.	21 Pender St. W., Vancouver	"
Gilroy McKay Lumber Co., Ltd.	1129 Standard Bldg., Vancouver.	"
The Laidlaw Shingle Co.	Waleach	Shingle-mill.
Erie Lumber Co.	Erie	"
McPhalan Lumber Co., Ltd.	Mission	Sawmill (suspended opera- tions).
Dominion Lumber Co., Ltd.	Wire Cache	Sawmill.
Osoyoos Lumber Co.	Graham's Ranch, Sidney	Sawmill, etc.
The Ruskin Operations, Ltd.	Stave Falls	Shingle-mill.
Frank A. Willis	Dewar's Wharf, Vancouver	Manufacturing shingles.
Douglas Fir Products & Shingles, Ltd.	620 Pacific Bldg., Vancouver	Shingles.
The Holt Creek Lumber Co.	Duncan	Sawmill, etc.
Saturna Saw & Planing Mills	Saturna	Sawmill.
Logan-Garcin Lumber Co.	Victoria	"
De Blac & Bessette	Lumby	"
Flanagan Bros.	Cloverdale	"
The Prospect Lumber Co.	R.R. No. 3, Victoria	Sawmill (suspended opera- tions).
Renfrew Lumber Co., Ltd.	654 Yates St., Victoria	Ditto.
The White Rock Tie & Lumber Co.	White Rock	Sawmill.
Lumber Specialty, Ltd.	406 Winch Bldg., Vancouver	Lath-mill (assigned).
W. T. Stevens	Westbank	Sawmill.
D. Rogers	Cloverdale	"
T. R. Davis	Terrace	"
The Union Cedar Mills, Ltd.	414 Yorkshire Bldg., Vancouver	Shingle mill.
H. L. Latremouille	Louis Creek	Sawmill.
Nicol Lumber Co.	Vedder Crossing	"
Thorpe & Lancaster	Nelson	"
John Renwick & Son	Crescent Valley	Sawmill, etc.
The E. & M. Lumber Co.	Merville	Sawmill.
H. J. Parker	Merritt	"
R. T. Burnett & A. Stewart	Capilano	"
A. S. Rutherford & Louis Hanson	Prince George	"
The Bailey Hobbs Lumber Co., Ltd.	114 Crown Bldg., Vancouver	Shingle-mill.
John Freeman	Kamloops	Gasolene sawmill.
Newton Sawmill	Newton P.O.	Sawmill (suspended opera- tions).
Joyce & Johnston	Quesnel	Sawmill.
Lorne E. Butt Lumber & Shingle Mills, Ltd.	Mission City	Shingle-mill.
McArthur & Co.	Midway	Sawmill.
Percy Cotton	Adelphi P.O.	"
Comaplix Mills, Ltd.	Comaplix	"
The Chase Creek Lumber Co., Ltd.	Shuswap	"
Baskin Geynrtz Lumber Co., Ltd.	Nelson	Shingle-mill (suspended opera- tions).
John C. Dill	325 Howe St., Vancouver	Shingle-mill.
H. M. Hornby	Cloverdale	Sawmill.
W. J. McIntyre	Sicamons	"
Neilson Shingle Co.	Silverdale	Shingle-mill (suspended opera- tions).

SHEET-METAL WORKS.

Firm.	Location.	Industry.
Eburne Sheet Metal Works	Marpole	Sheet-metal works.
F. W. Hamilton	1618 Commercial St., Vancouver..	" "
Ansell Sheet Metal Works	2215 Thirteenth Ave. W., Van-	" "
	couver.	
E. L. Armstrong	1329 Granville St., Vancouver...	" "
A. J. Barker	516 Pender St. W., Vancouver ..	" "
Grandview Sheet Metal Works	1685 Venables St., Vancouver ...	" "
Johnson Lee	826 Dunsmuir St., Vancouver ..	" "
James H. Hatch	69 Cordova St. W., Vancouver ..	" "
H. & H. Sheet Metal Works	735 Richards St., Vancouver ...	" "
Frank Little Sheet Metal Works	1168 Seymour St., Vancouver ...	" "
John K. Miller Co., Ltd.	337 Dufferin St., Vancouver	" "
J. R. Tacey & Son	1160 Seymour St., Vancouver ...	" "
Pacific Sheet Metal Works, Ltd.	523 Seventh Ave., W., Vancouver	" "
B.C. Sheet Metal Works	Victoria	" "
Pacific Sheet Metal Works, Ltd.	"	" "
Victoria Sheet Metal Works	434 Kingston St., Victoria	" "
Sixth Avenue Sheet Metal Works	Prince Rupert	" "
Terminal Sheet Metal Works, Ltd.	1043 Pender St., Vancouver	" "
Steen & Longwill	Prince Rupert	" "
Campbell & Grill	1238 Seymour St., Vancouver ...	" "
New Idea Sheet Metal Works	757 Beatty St., Vancouver	" "
Central Sheet Metal Works	560 Cambie St., Vancouver	" "
Nelson Hardware Co.	Nelson	" "
Rowe's Sheet Metal Works	Prince George	" "
Columbia Copper & Sheet Steel Manufac-	2421 Scotia St., Vancouver	Manufacturing sheet copper
turing Co.		and steel.
Latimer & Sons, Ltd.	550 Main St., Vancouver	Sheet-metal works.
D'Arcy B. Plunkett	2519 Rock Bay Ave., Victoria ..	" "
A. W. Schwan	8 Cordova St. E., Vancouver	" "
McLeod Sheet Metal Works	1042 Richards St., Vancouver ..	" "
Smith & Kirkland	1537 Kingsway, Vancouver	" "
Vancouver Sheet Metal	1690 Hamilton St., Vancouver ..	" "
The Metallic Heating & Ventilating Co.,	2301 Cambie St., Vancouver	" "
Ltd.		
British Columbia Ceiling & Roofing Co.,	823 Seventh Ave. W., Vancouver	" "
Ltd.		
C. W. Grafton	153 Keefer St., Vancouver	" "

TANNERIES, MANUFACTURE OF LEATHER GOODS, GLOVES, AND SHOES.

Sandell Manufacturing Co., Ltd.	P.O. Box 316, Vancouver	Manufacturing leather gloves.
W. T. Glenn & Sons	Kelowna	Manufacturing leather goods.
Okanagan Saddlery	Vernon	" "
A. J. Beer	West Summerland	" "
B.C. Saddlery Co., Ltd.	Victoria	" "
William Duncan	1322 Douglas St., Victoria	" "
F. Norris & Sons	1320 Government St., Victoria ..	" "
Wilcox-Hall Co., Ltd.	Kamloops	" "
Sterling Glove Co.	Vancouver	Manufacturing leather gloves
		(suspended operations).
Searson & Russell	232 Cambie St., Vancouver	Making canvas gloves.
Vancouver Glove Co.	223 Carrall St., Vancouver	Manufacturing gloves.
Lawrence & Bishop	Mission City	Manufacturing leather goods.
S. Nelson & Co.	304 London Bldg., Vancouver ..	Tannery.
John Watson	127 Dufferin St. E., Vancouver..	Manufacturing leather gloves.
Standard Shoe Manufacturing Co.	Vancouver	Manufacturing shoes.
J. Leckie Co., Ltd.	"	" "
Leckie Tannery	"	Tannery.

MANUFACTURE OF WOODEN TOYS.

Western Toy and Furniture Manufactur-	Vancouver	Wooden toys.
ing Co.		
Quinton A. Gosling	Murrayville	Wooden toys (suspended opera-
		tions).
Hiker Manufacturing Co., Ltd.	Victoria	Wooden toys.
H. C. Derrlek	Vancouver	Wooden toys (suspended opera-
		tions).
Mrs. Emma G. Barnard	"	Wooden toys.
Dominion Composition Furniture & Toy	Victoria	Manufacturing toys.
Manufacturing Co., Ltd.		

MISCELLANEOUS WOOD-WORKING PLANTS.

Firm.	Location.	Industry.
Kootenay Wire Works Co.	Nelson	Manufacturing wire mattresses and box-making.
A. Lundberg	Vancouver	Manufacturing artificial limbs.
Black Bros., Ltd.	"	Manufacturing auto tops and bodies.
E. C. Chrystall	"	Building construction.
Dominion Manufacturing, Ltd. (Vancouver Casket Co.)	"	Caskets and undertaking supplies.
Shaw Manufacturing Co., Ltd.	Central Park	Children's vehicles.
William J. Mable	Victoria	Manufacturing vehicles and repairs.
Marston Show Case Co.	Cedar Cottage	Show-cases.
Imperial Casket Co.	Vancouver	Caskets and undertaking supplies.
Twentieth Century House Co., Ltd.	"	Ready-cut houses (suspended operations).
J. S. Goddard	"	Auto tops and bodies.
Auto Body Builders	"	Manufacturing vehicles.
Canada Dolls, Ltd.	South Vancouver	Dolls and novelties.
Mill Cut Homes & Lumber, Ltd.	Vancouver	Cut-to-fit houses.
The Shummons, Ltd.	"	Iron beds, etc.
Vancouver Creosoting Co., Ltd.	"	Creosoting timber.
Cut-to-fit Buildings Co., Ltd.	"	Cut-to-fit houses.
S. M. Simpson	Kelowna	Wood-working plant.
John Brown	Vancouver	Carpenter-shop.
Pacific Coast Pipe Co., Ltd.	Vancouver	Manufacturing wood pipe.
Columbia Pulleys, Ltd.	"	Manufacturing wood pulleys.
Coast Box Co.	"	Wooden boxes.
Hardwood Lumber Co., Ltd.	"	Wood-working.
Terminal Construction & Manufacturing Co., Ltd.	"	"
Okanagan Building & Trading Co., Ltd.	Kelowna	Wood-working (suspended operations).
Dominion Woodwork Manufacturing Co.	"	Ditto.
Chalmers Cabinet Works, Ltd.	Vancouver	Wood-working.
Great West Manufacturing Co., Ltd.	"	"
C. A. C. Allen	Vernon	"
Canadian Pipe Co., Ltd.	550 Pacific St., Vancouver	Manufacturing wood pipes.
W. F. Drysdale	1033 North Park St., Victoria ..	Wood-working.
Williams, Trerise & Williams	853 Cormorant St., Victoria	"
Dalziel Box Co.	Victoria	Manufacturing wooden boxes.
Standard Box Co.	Langley Prairie	Box-factory.
Johnson & Allan	148 Lorne St. E., Vancouver	Wood-working.
Canadian Box Co., Ltd.	101 Dufferin St., Vancouver	Manufacturing wooden boxes.
J. F. Stainton	Vernon	Wood-working.
Canadian Western Woodworkers	Victoria	"
Northwestern Box Co., Ltd.	607 Northwest Bldg., Vancouver ..	Box-factory.
San Juan Box Co., Ltd.	Port Renfrew	Manufacturing boxes.
Sunset Woodworkers	Vancouver	Wood-working.

MISCELLANEOUS.

B.C. Anchor Fence Co., Ltd.	1031 Pender St. W., Vancouver ..	Manufacturing wire fences.
Canadian Northwest Steel Co., Ltd.	Front and Prince Edward St., Vancouver.	Fabrication and assembly steel.
Great Western Smelting & Refining Co.	146 Dufferin St. E., Vancouver ..	Manufacturing babbit.
Morrison Steel & Wire Co.	Granville Island, Vancouver	Manufacturing wire nails.
Opsal Steel Co., Ltd.	Vancouver	Making steel and manufacturing tools.
Sea Island Can Co., Ltd.	597 Hastings St. W., Vancouver ..	Manufacturing cans.
Aetna Saw Works, Ltd.	Industrial Island, Vancouver	Manufacturing saws.
The Britannia Wire Rope Co., Ltd. ..	Granville Island, Vancouver	Manufacturing wire rope.
Racmaekers & Stephen Bros.	Vancouver	Manufacturing agents.
The Lowox Steel Co., Ltd.	Foot of Smythe St., Vancouver ..	Steel.
Vancouver Rolling Mills Co., Ltd.	Eburne	Rolling-mills.
Atlas Steel Products, Ltd.	Industrial Island, Vancouver	Manufacturing steel products.
Pacific Copper & Brazing Co.	130 Dufferin St. W., Vancouver ..	Coppersmithing.
B.C. Silver & Nickel Plating Works ..	534 Howe St., Vancouver	Silverplating.
Cascade Plating Works	"	Electroplating.
Roote's Auto Top Co.	740 Pacific St., Vancouver	Manufacturing auto-tops.
H. M. Nugent & Co.	48 Water St., Vancouver	Manufacturing tents and awnings.
Peerless Products, Ltd.	1150 Hamilton St., Vancouver ..	Manufacturing ink.
Victoria Tent Factory	618 Pandora St., Victoria	Manufacturing tents and sails.
Dominion Carton & Printing Works ..	Victoria	Manufacturing paper boxes.
Wm. N. O'Neil Co., Ltd.	"	Manufacturing art glass.
W. J. Pendray & Sons, Ltd.	"	Manufacturing soap.
Sidney Roofing & Paper Co., Ltd.	Victoria and Sidney	Manufacturing rubber roofing.
Victoria Mattress Works	Victoria	Manufacturing mattresses.
Gabriola Shale Products, Ltd.	Moody Block, Victoria	Manufacturing brick, with clay digging.
Pacific Coast Fluff Rug Co.	1069 Richards St., Vancouver ...	Manufacturing fluff rugs.
Canadian Bag Co., Ltd.	1152 Mainland St., Vancouver ..	Manufacturing jute bags.
Modern Macaroni Factory	638 Cormorant St., Victoria	Manufacturing macaroni.

MISCELLANEOUS—Continued.

Firm.	Location.	Industry.
Pacific Roofing Co., Ltd.	Industrial Island, Vancouver	Manufacturing roofing-paper.
A. J. Cassels & Co.	508 Richards St., Vancouver	Manufacturing window-shades.
Nakamura Bros.	174 Dufferin St. W., Vancouver..	Noodle-factory.
Western Tire & Rubber Co.	c/o Carter & Bird (assignee), 626 Pender St. W., Vancouver.	Manufacturing rubber goods.
B.C. Laboratories, Ltd.	Pender St. W., Vancouver	Manufacturing soap products.
The Canadian Refiners, Ltd.	415 Bank of Nova Scotia Bldg., Vancouver.	Refining of Epsom salts.
The Vancouver Island Riggers' & Sail- makers' Association, Ltd.	1304 Wharf St., Victoria	Sail-makers.
Canada Western Woollen Mills, Ltd. ..	Vancouver	Woollen-mill.
North America Noodle Factory	433 Georgia St. E., Vancouver..	Noodle-factory.
B.C. Vinegar Works, Ltd.	Vancouver	Manufacturing of vinegar.
B.C. Sugar Refinery Co., Ltd.	"	Manufacturing of sugar.
B.C. Pharmica Co., Ltd.	"	Manufacturing of drugs.
Davis Paper Box Co., Ltd.	1668 Pandora St., Vancouver ...	Manufacturing paper boxes.
National Paper Box & Carton Co., Ltd.	160 Lorne St. W., Vancouver ...	
Edward Lipsett	68 Water St., Vancouver	Manufacturing tents and awn- ings.
The Barrett Co., Ltd.	Tenth and Arbutus St., Vancouver	Manufacturing roofing.
Royal Crown Soaps Co., Ltd.	Vancouver	Manufacturing soap and paper boxes.
C. H. Jones & Son, Ltd.	28-30 Water St., Vancouver	Manufacturing tents and awn- ings.

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